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TITLE: THE WAGE PARITY QUESTION

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DRAFT STUDY

prepared for

*Canada*

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## CHAPTER I

### WAGE PARITY WITH THE UNITED STATES: AN OUTLINE OF THE ISSUES

#### A. Introduction

Although the U.S. and Canadian economies are similar in many respects, the overall average wage level -- and general per capita income level -- in Canada is significantly below that in the United States. Therein lies a source of conflict in Canadian collective bargaining. To the working man, it seems only just that he receive equal pay for equal work, particularly when he is continually bombarded by information on the income levels of U.S. workers only a few miles distant. To many Canadian employers the possibility of parity is an alarming one, involving potentially ruinous implications for profits in many, although by no means all, industries.

The question of wage parity -- or, indeed, any pattern of wages -- may be evaluated on the basis of a number of alternative criteria. First, and most obvious, comes the distribution of income; wage changes may alter the "share of the pie" going to labour as compared to other segments of the economy. Not surprisingly, attitudes regarding the equitable distribution of income differ rather sharply. Labour wants "more," although it generally has an interest in not pushing for higher wages to such an extent as to significantly endanger the level of employment in the industry in question. Management generally has an interest in slowing down the rate of wage increase in order to protect its share of the income,

but, once again, there are limits: management does not want to keep its wages so low that it becomes impossible to attract workers. Both labour and management may appeal to broad principles in support of their desire to protect and increase their income. A rise in labour income will usually increase the equality of income distribution, which is generally considered to be a desirable social goal -- at least within the ill-defined limits at which incentives become significantly diminished. An increase in the returns to capital will contribute to the resources available for capital formation, and thus provide the foundation on which future prosperity -- and rising future wages -- may be built. Essentially, however, the "desirable" distribution of income is a highly subjective matter, and one which does not give itself readily to analysis. In the pages below, therefore, relatively little reference will be made to distribution of income as a criterion for evaluating wage changes.

Rather, two issues will dominate the discussion below: economic efficiency and problems associated with changes in the general price level. Wages are, of course, a price, and as such influence the allocation of resources: a rise in wages in one industry and a fall in another, for example, would discourage the use of labour in the first industry and encourage its use in the second. In considering the efficiency criterion, we begin at the economist's natural starting point, the competitive equilibrium model, in which all participants



in the economy consider all prices (including wage rates) to be beyond their control. (See section C of this chapter.) This is not to suggest that a competitive equilibrium exists within the Canadian economy: it does not. Most obviously, some segments of the economy -- both labour and management -- possess market power to some degree. (That is, single organizations have the power to influence prices.) Rather, the competitive equilibrium provides a useful starting point, because in such a system economic efficiency exists in one important sense. But, while a competitive equilibrium is useful as a starting point, it cannot be taken directly as a basis for determining wage changes which contribute to the efficiency of the economy: the competitive equilibrium is too far from the real world to be directly and mechanically used. (See section D.)

The rules of thumb which have been enunciated by other governments -- such as the wage-price guideposts in the U.S. and the incomes policies in Britain -- have been aimed, not at promoting allocative efficiency of the economy, but rather at reducing inflationary pressures. (Inflation and allocation are not, of course, completely separate issues: one objection to inflation is that it may cause an inefficient allocation of resources.) It goes without saying that the most critical anti-inflationary policies lie in the monetary-fiscal area, and no amount of exhortation will counteract the inflationary effects of excessively expansionary monetary and

fiscal policies. However, in economies in which there are significant degrees of market power, it may be argued that the use of monetary and fiscal policies as the sole means of dealing with inflation will lead periodically to a major policy dilemma. If the sectors of the economy with market power use this power to push up prices before reasonably full employment is reached, then the policy-makers will receive conflicting signals. The upward creep of prices will point towards the necessity of restraining aggregate demand, while the still unsatisfactory employment situation will support the case for stimulating demand.<sup>1</sup> The acuteness of this policy dilemma is, however, very much a matter of dispute;<sup>2</sup> an evaluation of this

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<sup>1</sup>For a detailed discussion of the "dilemma model" in the context of the United States in the 1950's, see William G. Bowen, The Wage-Price Issue: A Theoretical Analysis (Princeton, N. J.: Princeton University Press, 1960).

<sup>2</sup>On the Canadian evidence, see Ronald G. Bodkin, Grant L. Reuber, and T. Russell Robinson, Price Stability and High Employment: The Options for Canadian Economic Policy (Economic Council of Canada, Special Study #5, September 1966).

In his study of Wage Determination in Canada (Economics and Research Branch, Department of Labour, Occasional Paper #3, April 1965), pp. 21, 41, George Saunders concludes that wages respond quickly to changes in demand and supply conditions; thus, "there appears little likelihood of wages being



very difficult point lies outside the scope of this study. However, since the application in Canada of wage guideposts would have clear relevance to the wage parity question, an evaluation of the issues surrounding guideposts is germane to an evaluation of the implications of parity.

In Section E, we evaluate a wage guidepost which involves the tying of wage increases to the average real increase in labour productivity throughout the economy. It is concluded that such a guidepost may hamper the reallocation of resources in a changing economy, and thus should be considered with caution, particularly if it is proposed as being more than a temporary stop-gap to deal with a pressing short-run problem. This cautious conclusion, is, of course, hardly surprising, as even the staunchest advocates of guideposts recognize that they may have undesirable side effects, but feel that these drawbacks are more than outweighed by the necessity of doing

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causal factors in price inflation" (p. 42). Unfortunately, however, reliable data on fringe benefits are lacking, and fringes gain in relative importance during periods of high unemployment (p. 37). We might therefore conclude that a consideration of wage data alone somewhat overstates the responsiveness of total labour costs to changes in demand: thus, an element of uncertainty surrounds Saunders' conclusion regarding the lack of serious cost-push forces from the labour market.

something about the wage-price dilemma.

An alternative starting point for wage negotiations, and one which has gained considerable currency in the parity debate, involves a U.S.-Canadian wage differential based on relative U.S.-Canadian labour productivity in the industry in question. (Section F.) Thus, wages in a specific Canadian industry could be raised to -- or beyond -- U.S. levels if Canadian productivity in that industry equalled -- or exceeded -- U.S. productivity in the same industry; however, in industries where Canadian productivity lagged behind U.S. levels, Canadian wage rates would remain lower than U.S. rates. Both management and labour have recognized variations on this single-industry productivity criterion although, not very surprisingly, the emphasis of the two sides has been different: management has argued that parity would be disastrous in many industries because of lower Canadian productivity, while labour has argued that some Canadian employers can and should pay parity wages because their productivity compares favourably with U.S. productivity.<sup>1</sup> In spite of the widespread

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<sup>1</sup>For example, the recent study released by Massey-Ferguson stresses relative productivity. See Hedlin, Menzies & Associates, Ltd., Wage Parity and Massey-Ferguson in Canada (Winnipeg, 1967).

A recent labour statement may be found in the prefatory remarks of William Dodge, John Fryer, Donald MacDonald, William

appeal of this proposition, it will be argued below (Section F) that, if taken to its logical conclusion, the single-industry productivity criterion contains very unfortunate implications for the interregional and international pattern of industry,

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Lahoney, and Joe Morris on p. ix of M. H. Lithwick, Prices, Productivity, and Canada's Competitive Position (Montreal: Canadian Trade Committee, Private Planning Association of Canada, Oct. 1967). Their statement reads:

While we recognize that "across-the-board" wage parity is not an immediately attainable goal for the Canadian economy as a whole, nevertheless we feel it necessary to emphasize the fact that no responsible leader of the organized labour movement in Canada, to the best of our knowledge, has ever suggested that it was. Furthermore, we feel it should be noted that in several Canadian industries (for example, West Coast pulp and paper, tobacco, cans, certain sections of mining, and others) wage parity already exists with the United States and that in several others, based on the criterion of productivity performance in Canada, such parity in labour remuneration is quite feasible and could be achieved without disastrous effects for our competitive position.

A similar statement was made by Mr. MacDonald in an interview with John Schreiner, reported in the Financial Post, May 25, 1968, p. 23:

There seems to be an impression abroad that labour officially at this time is seeking parity with American wages on an overall basis. And this is just not so. We know the economic facts of life. In the automobile industry, I think that parity is justified. How can it be otherwise, with a common market? The workers don't control the productivity difference.



and, indeed, undercuts the economic forces which work toward economic efficiency through regional and national specialization.

Thus, there are defects in two of the most common "rules of thumb" used as reference points in labour negotiations. A U.S.-style guideline, aimed at stabilizing the general price level, has in practice shown limited flexibility in dealing with allocation problems, while the single-industry productivity criterion frequently appealed to in Canada has rather disturbing implications for the efficient international and inter-regional allocation of production. In Section G, possible third alternatives are considered, using the two basic criteria of stable prices and efficiency of resource allocation. In the final sections (H-I) of this chapter, two specific industries (autos, farm implements) are used to illustrate some of the problems which might arise in applying the guideline concept to a specific industry.

In this study, we examine possible guidelines in terms of their relative appropriateness to the Canadian situation. It cannot be stressed too strongly, however, that no position is taken on the question of whether the government should become extensively involved in the collective bargaining process by the promulgation of wage guidelines. To make such a judgment, it would be necessary to go into political, institutional, and economic matters (such as the extent of the wage-price dilemma)

which clearly lie beyond the scope of this paper.

While this first chapter evaluates the theoretical issues associated with parity, the final three chapters present statistical information. The second quite simply presents recent trends in U.S.-Canadian wage differentials by major industrial groups. The third presents calculations of the possible price implications of parity wages in various industrial sectors. The fourth chapter is a projection of the aggregative implications of parity. It must be emphasized that these last two chapters are based on a number of specific assumptions -- such as the assumption that U.S.-Canadian productivity differentials remain unchanged; a modification of the assumptions would alter the statistical results.

Before we proceed to the theoretical core of this chapter, it is necessary to define precisely what is meant by "parity." The term is apparently simple, involving equality of wages. But there are conceptual complications because at least four basically different interpretations may be given to equality. Although only the first two of these interpretations have gained common usage in the parity discussion to date, at least one other (#3 below) becomes important when the detailed logical implications of parity are considered.

#### B. Wage Parity: Four Possible Definitions

1. Most obviously, parity may be said to exist where the

wage rate in Canada, in Canadian dollars, is made equal to the wage rate in the U.S., expressed in U.S. dollars. This is the most common meaning applied to parity, having been the basis, for example, for the recent negotiations in the automotive industry. This concept of parity abstracts from such important economic phenomena as differences in the exchange value of currencies, but it is the most obvious and straightforward definition to use. Such a parity will be referred to below as nominal parity, or, simply, as parity without a modifying adjective.

2. A second concept of parity takes into account the difference between the exchange values of the two currencies; this may be called exchange-adjusted parity, or, more simply, adjusted parity. At the exchange rate of \$1.00 Canadian = 92.5¢ U.S., for example, a Canadian wage would have to be \$4.00 per hour to equal a U.S. wage rate of \$3.70 per hour. If parity existed in this sense -- after adjustment for the exchange rate -- then the monetary wage costs per worker would be the same for employers on both sides of the border, and there would consequently be no net competitive advantage because of wage costs per man. This does not mean, of course, that the international competitive position of various employers would be equal under adjusted parity, since much more than the wage rate goes into determining international competitive position. Also important are output per man, cost and availability of inputs, transportation costs on the final output, marketing costs,



tariffs which must be paid in order to gain access to markets, and so on. However, because it takes account of the exchange differential, this second concept of parity is logically important, particularly when questions of international competitiveness are under consideration. Because the exchange rate is a simple and easily observable fact, the relationship between nominal parity and exchange-adjusted parity is likewise simple and straightforward. At the present exchange rate, for example, adjusted parity would require a greater upward revision of Canadian wage rates than would nominal parity; in the late fifties, on the other hand, the Canadian dollar commanded an exchange premium, and adjusted parity was closer to being achieved than was nominal parity.

3. If nominal parity were achieved, it would not necessarily mean that the standard of living would be the same in the two countries. For real parity to exist, an adjustment would have to be made for differences in the cost of living. Unlike the exchange adjustment, the cost of living adjustment is by no means simple or straightforward. While it is true that some of the most obvious things -- and, in particular, internationally-traded manufactured goods -- are generally more expensive in Canada (in Canadian dollars) than in the United States (in U.S. dollars), other important components of consumer expenditure -- particularly service items -- seem to be

less expensive on the whole in Canada than in the U.S.<sup>1</sup> It is not entirely clear which country has the higher cost of living in terms of its domestic currency, and therefore we cannot be certain whether real parity would involve a greater or smaller wage change than nominal parity. There is considerable literature on the difficulties and pitfalls in comparing national standards of living,<sup>2</sup> and, while it is true that these difficulties are less pronounced in cases where the economies are as similar as the U.S. and Canadian, the (index number) problem

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<sup>1</sup>In his Real Income Comparison, Canada-United States, 1965 and Selected Years Back to 1950 (International Association for Research in Income and Wealth, Maynooth Conference, Ireland, mimeo., August 1967), E.C. West presents data indicating that goods were between 2 $\frac{1}{2}$  and 4 $\frac{1}{2}$  per cent more expensive in Canada (without adjustment for the exchange rate), while services were 8 or 9 per cent cheaper. West's averages of the two components show the cost of living to be 2.3 per cent lower in Canada than in the U.S. on the basis of 1965 Canadian weights, and 0.6 per cent lower with 1965 U.S. weights.

See also Prices Division, D.B.S., Comparative Consumer Price Levels in the United States and Canada (mimeo., 1967).

<sup>2</sup>See, e.g., Wilton Gilbert and Irving B. Kravis, An International Comparison of National Products and the Purchasing Power of Currencies (Paris: O.E.E.C., 1954).

nevertheless exists in comparing the costs of living in the North American countries.<sup>1</sup> These difficulties alone are enough to preclude the presentation of wage changes needed to obtain real parity: the data in the following chapters are therefore confined to nominal and adjusted parity.

But there is an even greater statistical problem in estimating the effects of real parity, since, if there is any tendency for wage increases to be passed along in the form of higher prices, then the achievement of parity in any one industry will change the wage increase necessary to achieve real parity in other industries. In other words, because wage changes may affect final prices, the present cost of living does not give an adequate basis for the calculation of wage changes necessary to achieve real parity, except in cases where such parity is being considered for only a single (small) industry.<sup>2</sup>

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<sup>1</sup>In the example two footnotes back, changing the country weights makes a difference of almost 2 per cent in the cost of living comparison.

<sup>2</sup>To a lesser degree, there is a general equilibrium problem when exchange-adjusted parity is considered. If such parity is granted in any broad sector of the economy, and if the closing of U.S.-Canadian wage differentials is unaccompanied by a comparable closing of productivity differentials, then pressures on the Canadian balance of payments may result. If these pressures are allowed to express themselves in a fall in the Canadian dollar, then the wage change for exchange-adjusted parity will have to be revised.



More will be said directly below about this problem of inter-relation among industries, and some information on the strength of interindustry ties is presented in section B of Chapter III.

If the statistical problems preclude a simple estimation of real parity data, then it might seem that this third definition of parity should be dismissed from further consideration. There are, however, two major arguments which may be used against such a dismissal. While exchange adjusted parity is logically the most significant of the parity concepts in evaluating the international competitiveness of products, real parity is logically the most significant concept to the worker, interested in the standard of living which his wage will support.

The second argument is even more important, particularly with regard to the controversy surrounding the parity discussion. Suppose for the moment that the conclusion is reached that it is beyond the capabilities of the Canadian economy to reach the per capita level of real output of the U.S. economy, and that the non-labour sectors of the economy have the power (economic or political) to protect their relative shares of national output. Then across-the-board real parity becomes an impossibility, and any drive which might occur for parity must fall short of achieving real parity.

This might happen in several ways. Labour might lose its point at the bargaining table, settling for less than real

parity: it might win a lesser degree of parity than real parity. If it won nominal parity, for example, the deterioration of the competitive position of Canadian producers would be reflected in the balance of payments, with pressures for a devaluation of the Canadian dollar. If, on the other hand, labour insisted on a parity adjusted for the rate of exchange, then a devaluation of the Canadian dollar would not provide an escape from the competitive problems associated with parity. Defense of the Canadian balance of payments might then be expected to shift to more direct means, such as tariffs, import quotas, or exchange controls. These two methods of escaping the balance of payments consequences of parity -- through a devaluation if nominal parity is achieved, or through additional protective devices if a commitment is made to exchange-adjusted parity -- are not matters of indifference from an economic viewpoint. The devaluation route involves financial disturbances and obvious burdens on those with incomes or assets which are relatively fixed in monetary terms. An increase in protection involves these disturbances, plus one major addition: the relative positions of import-competing industries are improved at the expense of export industries, with a consequent adjustment of the pattern of production. In either case -- nominal parity with relief of the competitive pressures coming through devaluation, or adjusted parity with relief of the competitive

pressures coming through protective measures<sup>1</sup> -- real parity would remain unachieved,<sup>2</sup> with increases in the monetary wage being accompanied by increases in the cost of living.

If labour were determined and able to make a strong bid for across-the-board real wage parity, while other groups were able to take strong counteraction to protect their shares of national product, then there would be an insoluble economic conflict, unless Canadian productivity rose toward U.S. levels. Open inflation would ensue, with inexorable pressures on the real incomes of the hindermost.

It cannot be stressed too strongly that the above propositions are intended to illustrate the logical distinctions

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<sup>1</sup>In fact, the dichotomy would not be quite so sharp. With nominal parity also, competitive pressures might lead to protection as a partial or complete alternative to devaluation. The point rather is that nominal parity provides two competitive escapes -- devaluation or protection -- while adjusted parity leaves only one: protection.

<sup>2</sup>Insofar as a movement toward nominal or exchange-adjusted parity led to balance of payments problems, higher tariffs, and hence to a less efficient economy, the net result might be a decrease in the real wage, rather than a movement towards real parity.



among the various concepts of parity, and are based on a number of specific assumptions: that productivity in Canada does not rise to U.S. levels; that labour has the capacity and desire for making strong, across-the-board bids for parity in some sense; and that other segments of the economy are prepared and able to take strong countermoves to prevent the fall of their shares of the national income. We are not arguing that these assumptions are true-to-life: quite the contrary. For example, labour spokesmen have explicitly declined to take a position in favour of across-the-board parity.<sup>1</sup> Furthermore, no light has yet been shed on such critical questions as the economic desirability of parity in Canadian industries where the productivity of workers is at U.S. levels.

4. There remains a fourth concept of parity. Wages could be equalized in such a way as to not only take into account differences in the cost of living as it is normally calculated, but also differences in the amenities which make various locations either particularly attractive or particularly unattractive. For example, where work is done in a remote and bleak mining camp, wages might be higher than in more attractive areas by an amount sufficient to compensate for the discomforts. Similarly, where climatic, social or cultural conditions make an area particularly attractive, wages might be lower than elsewhere. Wage

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<sup>1</sup>See fn. 1, p. 6 above.

equality which takes into account such amenities may be called total parity.

Total parity is a useful economic concept, but one which is even more difficult to estimate quantitatively than real parity. Logically, it is the relevant concept when questions of migration are being considered -- workers presumably respond not only to real wage forces, but also to amenities when choosing jobs. The difficulties in calculation arise not only because economists are not particularly well suited to evaluate the cultural and psychological forces in question, but also because tastes on these matters differ sharply among individuals. For example, some workers may prefer a climate which is warm throughout the year, and therefore find areas like Florida and Southern California to be particularly attractive; others may prefer the variety of a temperate climate. Thus, if an estimate is to be made of comparative wages under a total parity concept, it is not entirely clear which area should command the higher wage. By comparison, the concept of real parity is unambiguous: in areas where the cost of living is high, monetary wages should be high to achieve real parity.

In summary, then, we have four concepts of parity with the following characteristics.

TABLE I. PARITY CONCEPTS

Concept	Adjustment Made For	Primary Significance	Problems In Numerical Estimation	Possible "Escape Valve" (other than productivity increase)
1. Nominal Parity		The most obvious comparison	What is a "comparable job;" how are fringe benefits handled?	Devaluation; tariffs or balance of payments controls
2. Exchange-Adjusted Parity	Exchange Rate (at current exchange rate adjusted parity thus involves greater wage changes than nominal parity)	In calculating international competitive pressures on employers	Same as for #1, plus general equilibrium problems if wage increases affect exchange rate	Tariffs or balance of payments controls only; devaluation provides no escape
3. Real Parity	Cost of living (smaller wage changes than for adjusted parity; quantitative comparison with nominal parity unclear)	In calculating relative economic positions of workers	Same as for #2, plus (a) problems of comparing costs of living (index number problem) (b) general equilibrium problems where wage increases cause price increases	None
2. Total Parity	Cost of living plus amenities (quantitative comparison with real parity unclear)	In evaluating incentives to migrate	Same as for #3, plus problems of evaluating amenities	None



One additional point, not mentioned at an earlier stage, has been noted in Table 1. The returns which a worker gets from his job -- and the cost of workers as seen by employers -- depends not only on simple wage rates themselves, but also on fringe benefits. Viewed from either the employers' or the workers' side, fringes should be included in the calculations; there is, however, difficulty in obtaining comparable data. In addition, the classification of workers further complicates comparisons; where it is relatively difficult to obtain a re-classification into a higher-paying job, published wage rates over-state the relative position of the workers concerned.

So much for the conceptual and definitional problems. It has been necessary to make these clarifications because the most readily available data are frequently not exactly those most relevant to the argument. In particular, the data presented below (Chapter III) are confined to changes in Canadian wage rates necessary to achieve either apparent parity or exchange-adjusted parity; thus, some important aspects are slid over in the empirical sections.

#### C. A Basis for the Efficiency Discussion: The Perfectly Competitive Equilibrium.

As noted in the introduction, two major criteria will pervade our discussion of the significance of wage changes, namely, economic efficiency and price stability. The

efficiency question is a difficult one to deal with, and, in order to provide a framework for the latter discussion, we begin by considering the pattern of wages in a perfectly competitive equilibrium; in such a situation, production is efficient within an economy, at least in one important respect. Specifically, subject to certain limitations mentioned below, output cannot be increased simply by shifting workers out of one job and into another. The major characteristic of a perfectly competitive situation, of course, is that all participants in the economy consider all prices -- including wage rates -- to be beyond their control; each individual and organization considers all prices given to him. This is not to argue that such competition actually exists within the Canadian economy. On the contrary, the basic rationale for unions is that it is important for workers to band together to give them some influence over the wage rate; the parity discussion itself is based on the assumption that union policy can influence wages. Nevertheless, in spite of its artificiality, the competitive concept provides a useful starting point.

In a competitive situation, with all prices and wages taken as given by all individual participants, each employer would continue to hire workers as long as the value of the additional amount of production per worker was greater than the wage per worker (including fringes). Workers would be attracted to high wage industries, and away from low wage industries, thereby

tending to reduce the wage which the high wage industry would have to pay, and increasing the wage which the low wage industry would have to pay in order to keep workers. Subject to some very important qualifications noted in the next paragraph, the wage rate (including fringes) in all industries would become equalized in equilibrium, and, as employers hire workers up to the point where the value of the marginal product equals the wage rate, the value of the marginal product of labour would be equalized across the economy.<sup>1</sup> Thus, total production could not

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<sup>1</sup>In this discussion it is assumed that, ceteris paribus, low wages will attract an industry to a location. This is a reasonable assumption; yet how can it be consistent with the observation that low-wage areas often have declining employment? The answer lies in the ceteris paribus assumption; for these areas, other influences (such as higher transport costs) more than offset the advantage of lower wage costs.

In other words, while low wages in themselves tend to attract industry, forces working for a positive relationship between wages and expansion may also exist. Generally favorable conditions (proximity to markets and raw materials, etc.) will attract industry and tend to drive up wage rates; unfavorable conditions will discourage industry and cause unemployment and low wages. It is quite possible, and, indeed, probable that these latter forces will predominate, and that, therefore, the observed relationship will be that low wages are associated



be increased simply by shifting workers from one industry to another, and the economy would be operating efficiently within the limits set by the quantity of resources.

This simple result is, however, subject to a number of qualifications. Where external economies are present, the competitive equilibrium would result in less being produced than is desirable; where external diseconomies are present, competition would result in too much being produced. Furthermore, in equilibrium, the equalization of wages would be qualified by a number of important factors. Risky or unpleasant occupations would command a continuing premium sufficient to compensate for the risk or unpleasantness; occupations requiring training would have wages sufficiently high to compensate for the training; locations where the weather or other conditions were unattractive would have higher wages, and so on. In other words, there would be a tendency towards total wage parity among industries and locations, modified by extra returns to workers who possessed special training or skills. However, such continuing wage differentials (in contrast to the effects of externalities) would

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with low industrial growth and unemployment. Nevertheless, it is still reasonable to expect that wage increases in any given area will tend to discourage industrial expansion, as compared to the situation which would have existed if wages had remained lower while all other favourable conditions in the area had remained.

not involve economic inefficiency. While it is true that measured national income could be increased if workers could be persuaded to switch from pleasant and safe jobs to miserable and risky ones, such shifts would not represent an economic improvement, since the increase in measured national income would be at least offset by the nonmonetary unpleasantness suffered by the workers.

Although total wage parity among various segments of an economy would be established if there were a perfectly competitive equilibrium, the average productivity of labour would not necessarily be the same in differing industries and in differing locations; indeed, it would be most peculiar if average productivity in various industries were equated. Some industries might be expected to use a relatively great amount of capital compared to labour, and in these industries the average productivity of labour (that is, the total production divided by the number of workers) would exceed average productivity in other industries. This does not mean that the high average productivity industries could or should pay higher wages than other industries. Their relatively high use of capital would necessitate a relatively high share of the income going into interest or profits; otherwise capital would tend to leave the industry. In other words, high average labour productivity does not in itself make a conclusive case for high wages, nor does low average labour productivity in itself make

a conclusive case for low wages. Thus, if wage rates are to be based on an industry's productivity, there are logical problems involved in considering average productivity;<sup>1</sup> marginal productivity is of prime logical importance, but here empirical problems arise, since marginal productivity is much more difficult to estimate than average productivity.

A variation on this perfectly competitive equilibrium, one introducing an imperfection in the form of geographic immobility of labour, is of particular relevance to the parity discussion. Although this model has been most conspicuous in international trade literature, and, indeed, has dominated much of international trade theory for over a century and a half, its conclusions are applicable to any geographic areas between which labour is partially or completely immobile, whether these geographic areas constitute nation states, or whether they are simply regions within a country.

Assume that labour is partly or completely immobile between regions, but is mobile between industries within regions. Then the competitive forces which would tend to equalize the incomes of different areas will be partly or completely broken. That is, if workers do not move from low wage areas to high wage areas, then the tendency for the wages in the poorer area

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<sup>1</sup>For further discussion (and a weakening) of this caution, see below, pp. 45-46.



to be driven up by the exodus of workers will be eliminated, as will the tendency for wages in the richer area to be restrained by the competition from immigrants.<sup>1</sup> If it is assumed, however, that labour remains mobile among industries within each area, then there will be a tendency towards wage equalization within each area, subject to continuing differentials for risk, unpleasantness, training, etc.

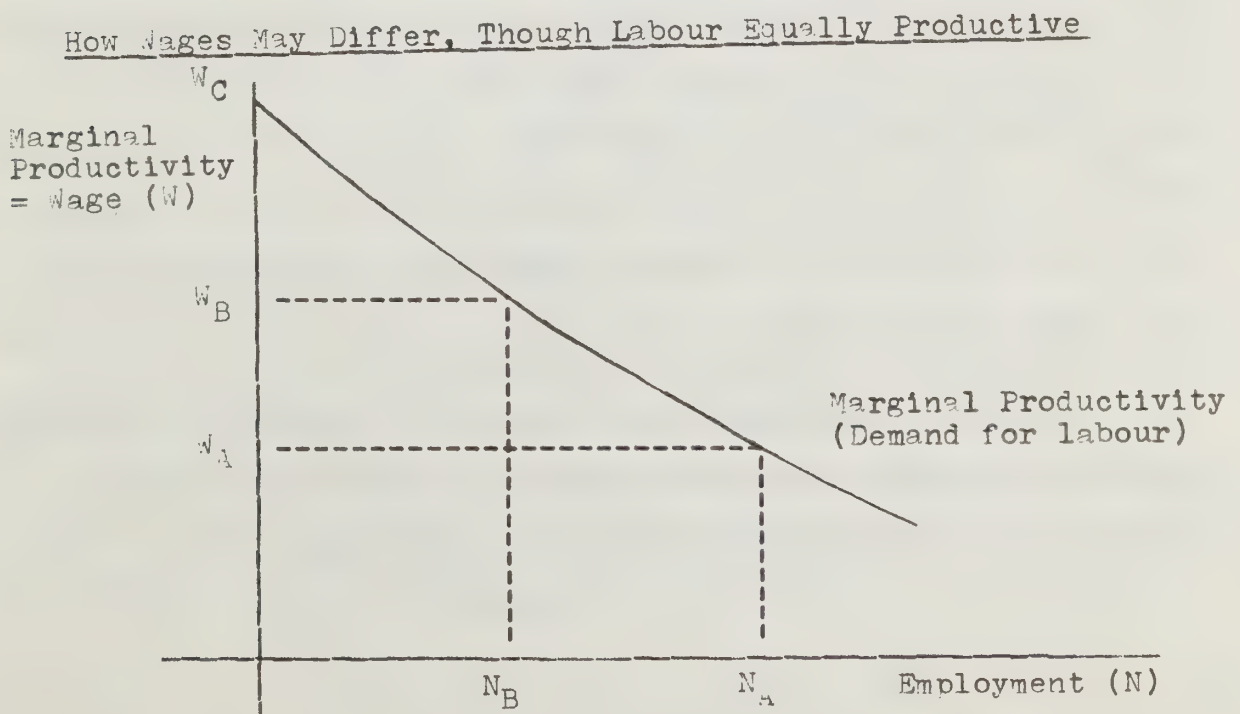
The wage level will remain high in areas with generally high productivity, and low in areas with generally low productivity. That is, (marginal) productivity for the region as a whole will determine the wage rate within the region; and the relative (marginal) productivities of the regions will determine their relative wage rates. What is true for a regional economy as a whole is not, however, true for a specific industry. One cannot look simply at the characteristics of, say, the shoe

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<sup>1</sup>Where there are substantial economies of scale, an influx of workers may lead to a rise rather than a fall in wage rates. This qualification, which is of utmost importance in evaluating the economic consequences of migration, is not directly relevant to the points discussed below, and therefore it is passed over here with only a brief mention. It might, however, be noted that economies of scale have been seen as a significant source of economic growth in the past two centuries. See Simon Kuznets, Modern Economic Growth: Rate, Structure, and Spread (New Haven: Yale University Press, 1966).

industry in two regions and deduce the relative equilibrium wages of the two shoe industries. Rather, the wage rate of the shoe industry in each region will be set in competition with alternative sources of employment in each region, and workers will be hired as long as their marginal productivity exceeds the wage rate. Thus, the shoe industries in the two regions might have identical inherent productivity characteristics, and yet their wages would be quite different in equilibrium as shown in Fig. 1. In area A, with a generally low wage rate ( $W_A$ ), shoe wages would likewise be low, and there would therefore be a tendency for heavy employment ( $N_A$ ) in this industry. In the high wage area (B), in contrast, the shoe industry would be small ( $N_B$ ). (It might perhaps even be nonexistent: with a wage rate greater than  $W_C$ , it would not be profitable for the entrepreneur to produce any shoes.)

FIGURE 1



If one were to look simply at the shoe industry, it might seem that this outcome is in some sense unjust: the worker in the poorer region works just as hard at producing shoes, and is just as productive, as the worker in the rich region; yet he receives a lower wage. On the other hand, the shoe manufacturer in the rich region could be just as efficient and competent as the shoe manufacturer in the poor region; yet he would find his profits much lower because of the high wage he found it necessary to pay in order to hold employees. But, no matter how much this outcome may offend apparent justice, there is much to be said for it on efficiency grounds so long as labour remains immobile and overall productivity differs among regions. The most obvious alternative -- equal (and presumably average height) wages in the shoe industries in each region, and equal (and average height) profits -- while seemingly more just, would be considerably less efficient. Because of the high-income alternatives in the rich area, it is undesirable for resources to be distracted into what are, for them, mediocre occupations such as shoe making; and it is therefore undesirable for shoemakers in the rich area to be rewarded for their use of resources by high profits.<sup>1</sup> In contrast, shoe making is a desirable occupation for the poorer region, given its low-paying alternatives. Since shoe making is

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<sup>1</sup>The theoretical purist will insist on a distinction between profits and economic rent at this point. This distinction is unimportant for the argument being presented here.



its strong suit, it is in the interests of the poorer region to encourage shoe production by shoe wages lower than those in the rich area, and by correspondingly higher profits. While the shoe wages are below those in the richer region, the demand for workers in the shoe industry (for domestic and export production) will tend to cause some increase in the overall wage rate in the poorer region, and improve conditions there.

The argument above will be recognized as a variation on the standard comparative cost proposition of international economics textbooks. It may be briefly rephrased in somewhat different terms. If interregional (or international) wage patterns in a specific industry are determined by the relative regional (or national) productivities in that industry, then the basis for mutually advantageous interregional (or international) trade will be undermined. For each such industry, the competitive position of all regions would tend to be equalized and, thus, the competitive advantage which make exports possible would tend to be eliminated. In its implications, the single-industry productivity criterion for wage levels is thus related to the "scientific" tariff argument which has been conspicuous among U.S. protectionists, particularly in the 1920's. "Scientific" tariffs set at the height necessary to equalize competitive conditions between foreign and domestic producers would, if taken to their logical extreme, destroy the basis for trade. Similarly, wage rates set in each industry at levels which reflect the relative regional productivities in that industry would, if

to technological extreme, destroy the basis for inter-regional trade. Of course, neither the "scientific" tariff nor the single industry productivity guideline for wages is likely to be taken to any logical extreme. Nevertheless, tendencies are important: just as strong worldwide protectionist pressures can be cause for concern even though there is no likelihood of trade being completely strangled, so reservations may be held regarding the single industry productivity criterion for wages, even though there is really no danger that adherence to such a criterion will be so extreme that interregional and international trade is completely eliminated.

This argument may be clarified by reference back to Figure 1. If the wage rate in Area A is determined by the productivity of the average worker on the board in all industries in Area A, the result is a wage of  $W_A$  and specialization of employment ( $N_A$ ) in this industry. This is what it should be, since this is an industry in which Area A has a comparative advantage. If, on the other hand, the wage rate in A is as high as in B (because of equal productivity in this single industry), then the wage and employment in A in this industry is in B (i.e.,  $W_B$  and  $N_B$ ).<sup>1</sup> This equation of

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<sup>1</sup> For expositional simplicity, several tacit assumptions have been made; most importantly, it has been assumed that the domestic market is the same size in each area. This assumption does not affect the substantive conclusions reached here; but its relaxation would necessitate a more complicated exposition.

wages has equated costs; thus area A would not specialize in shoemaking, even though this is its industry of comparative advantage.

There are two major ways in which the shoe wage in A might be set at  $W_B$ . If shoemakers are completely mobile between regions they may leave A unless the wage is as high as in B (i.e., the supply of shoemaking labour in A is completely elastic at a wage  $W_B$ ). In this case, competitive equilibrium will generate this shoe wage in A. To put it another way, if area A is to have a shoe industry at all, it will have to be at a 'parity' wage (i.e., the wage will have to correspond to the "total parity" concept discussed earlier.) The movement of labour across a regional boundary may provide a substitute to inter-regional trade as a means of approaching economic efficiency. Where labour is mobile interregionally, the concept of the overall marginal product of labour in the region becomes fuzzy. The earlier illustration would further lose relevance where major barriers to labour mobility exist among industries within a region.<sup>1</sup>

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<sup>1</sup>Although barriers associated with training (i.e., the formation of "human capital") may be integrated into the classical comparative cost discussion.

Where labour is interregionally mobile but immobile among industries, interindustry exchange rather than interregional trade



The second way in which  $W_B$  could be set in area A is, unlike the first, inconsistent with competitive equilibrium: through the exercise of market power shoemakers in A may be able to raise their wage to  $W_B$ . Thus we recognize that the pure competition model is inadequate in dealing with all real world situations. This issue is now considered in some detail.

#### D. The Perfectly Competitive Equilibrium: Its Limitations as a Guide for Wage Changes.

Although the competitive equilibrium will result in an economy in which resources are allocated efficiently (provided there are no externalities), it has limitations as a guide to actual wagemaking for a number of reasons. First, there is a data problem: as noted in the previous section, competitive equilibrium wages are not all equal. There are important differences attributable to differences in skills, training, pleasantness of work, and so on. To calculate the appropriate differentials for each of these factors would be a major task indeed.

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becomes governed by reciprocal demand, and the equation of marginal productivity is made across the specific industry rather than within a region. See the discussion of "noncompeting groups" in Richard E. Caves, Trade and Economic Structure (Cambridge, Mass.: Harvard University Press, 1960), pp. 60-61, et passim.

But even more importantly, there are theoretical difficulties which make the competitive equilibrium a highly defective guide to "desirable" wages. Most significantly, dynamic forces are in operation, requiring continual adjustment to new and more efficient methods of production; and competitive equilibrium wages do not provide the incentives for such adjustment. This point will be dealt with shortly.

A second theoretical problem arises because competition is imperfect. Where firms have market power -- that is, the ability individually to influence prices -- they will be unwilling to pay a wage rate equal to the market value of the marginal product of labour. By using their market power, firms may be able to make monopoly or oligopoly profits, that is, profits greater than those necessary to attract and hold capital in the industry.<sup>1</sup> In so doing, they will produce less, and hire less labour, than would be the case if they lacked market power, that is, if they continued to employ labour up to the point where the wage rate was equal to the market value of the marginal product of labour.

The possession of market power by employers leads to two

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<sup>1</sup>The existence of market power does not guarantee that there will be profits greater than normal. See E. H. Chamberlin, The Theory of Monopolistic Competition (Cambridge, Mass.: Harvard University Press, 1933).

broad economic arguments for unions. First, insofar as employers have power to influence the wage rate, it may be desirable for workers, through their unions, to participate in determining wages and thus the employer's power to set the wage rate will be limited. In such a circumstance, it is possible that, even though the wage rate may be higher than the rate which would be established in the absence of unions (and possibly higher than would exist if there were perfect competition), the employer will nevertheless hire more workers.<sup>1</sup> When taken to its practical application, this argument becomes a source of controversy, not only because of the obvious difference of interest of the two parties, but also because of the very real difficulties in estimating the degree of market power. (One problem arises because the degree of market power depends on the time horizon considered. For long periods of time, the degree of market power is less than for short periods.)

The second argument is that unions provide labour with market power to balance that of management, and thus help to protect labour's share of income; in John Kenneth Galbraith's words, unions provide labour with "countervailing power."<sup>2</sup>

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<sup>1</sup>This argument is analogous to the proposition that, if the government establishes a price ceiling lower than the price which the monopolist would otherwise charge, the monopolist may nevertheless be willing to sell more under certain circumstances.

<sup>2</sup>John Kenneth Galbraith, American Capitalism: A Theory of Countervailing Power (New York, 1952).



Critics of Galbraith point out that strong unions sometimes occur in industries where employers' power is weak, and vice versa,<sup>1</sup> so that, while strong unions may simply counterbalance the market power of some powerful employers, there is no assurance of this happy outcome; where strong unions face weak employers, they may raise similar problems as would occur in the event of unilateral strength on the part of employers. Furthermore, a general concentration may contribute to the price-employment dilemma noted in the introduction.

The issues here are clearly numerous and complex. At this point, it is sufficient to note that some segments of the economy do possess market power, and the questions of income distribution and resource allocation raised by these centers of power make any simple appeal to competitive equilibrium wages inappropriate as a guide to what wages "ought" to be.

As noted several pages previously, an even greater problem regarding the normative aspects of the competitive equilibrium lie in the failure of the competitive equilibrium wages and prices to provide for the adjustments desirable in a dynamic economy. As time passes, it is desirable that some workers shift jobs, in line with changing demand and the changing requirements arising from technological advance. The incentives

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<sup>1</sup>See, e.g., the discussion in Albert Rees, The Economics of Trade Unions (Chicago: University of Chicago Press, 1962), p. 83.

for such movement are provided by wage differentials;<sup>1</sup> workers are encouraged to move into dynamic new occupations by high returns. Thus, while non-equilibrium wage differentials are evidences of less than optimal efficiency (the economy would be even more efficient if the workers moved even more quickly, thus tending to eliminate the differentials), they do not contribute to the residual inefficiency. Quite the contrary. They provide the incentives for movement which will add to efficiency. Thus, it is inappropriate to use the competitive equilibrium wages in any simple or mechanical manner as the basis for establishing rules as to what "ought" to be; to do so would be to risk an interference with forces which contribute to the dynamic efficiency of an economy.

### E. A Possible "Rule of Thumb" for Wage Changes: The Average Increase in Productivity in an Economy.

In any discussion of comparative wage rates in Canada and the United States, it is natural to refer to the wage-price guideposts in the United States; this is particularly so because the use of such guidelines in Canada would generally prevent the achievement of parity wages unless there were both a dramatic narrowing of the overall Canadian-U.S. productivity gap and a trend of stable prices in the United States.

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<sup>1</sup>over and above the equilibrium differentials due to differences in risk, pleasantness, training and skills, etc.

The general guides for wage price behaviour enunciated by the Council of Economic Advisers in their 1962 Report involved wage increases for each industry equal to the overall increase in productivity for the economy as a whole. Industries whose productivity increases exceeded average rates would cut their prices, while industries with relatively slow increases in productivity would increase their prices.<sup>1</sup> If these guideposts were followed, then the average price level could be stabilized. Having protected itself from the price-employment dilemma, the government could proceed with expansive policies aimed at the restoration of full employment.

It was stressed, however, that general guideposts would have to be modified in order to reconcile them with the objectives of equity and efficiency.<sup>2</sup> The problem here is similar to the dynamic efficiency problem which would arise if the competitive equilibrium were taken as the basis for wage settlements. Specifically, where dynamic changes require a reallocation of resources, a high wage rate in the relatively rapidly growing industry may perform a very useful function in attracting labour to the industry. The Council suggested that wages could rise more than average where labour was inadequate to meet the needs of a growing market; in contrast, wage increases could be kept below average in industries with particular employment

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<sup>1</sup> Council of Economic Advisers, Annual Report, 1962, p. 189.

<sup>2</sup> Ibid., p. 189; Annual Report, 1963, p. 86.



problems. Where bargaining weakness had in the past resulted in abnormally low wages, greater than average increases could be tolerated, while increases should be less than average in industries where past bargaining strength had resulted in wages considerably higher than for other comparable work. Similarly, exceptions were called for in the price guidelines where profits were abnormally high or low compared to profits required to hold or attract capital in sufficient volume to produce goods sufficient to meet market demands. Nor were these modifications considered adequate: it might well be within the power of labour (or management) to improve their performance by extra effort; in such cases, it was desirable that they be provided with the incentive to do so by receiving large wage (or profit) increases.<sup>1</sup> In other words, the guideline based on the overall productivity of the economy was to be modified by the productivity of the particular industry in order to maintain incentives to produce more efficiently. This point must be stressed, as it is important for the discussion below, particularly that of section F. In addition, it should be noted that the resource allocation criterion mentioned at the beginning of this paragraph also tied desirable wage increases to the performance of the particular industry (or company) rather than the economy as a whole, although in this case the tie would be to profitability (as companies facing rapidly expanding demand tend to have high profits)

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<sup>1</sup>Annual Report, 1962, pp. 189-90.

rather than to physical productivity as such.

The trouble was that the logic of the situation drove the Council increasingly to softpedal these important qualifications. Although the government showed willingness to become directly involved in wage and price decisions where they saw the guideposts threatened, it was hoped that a major contribution could be made by providing an informed public with the basis for judging whether price and wage changes were in the national interest.<sup>1</sup> If guideposts are to be the rallying point for public pressures, they had better be simple; qualifications and complications tend to confuse and diffuse the discussion. As a consequence, the Council found itself defining the guideposts more and more explicitly, with less and less attention being paid to the critical qualifications as the threat of inflation grew.<sup>2</sup> In particular, the 1964 Report presented a series on productivity trends, with 3.2% being shown for the most recent 5 year period.<sup>3</sup> Although

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<sup>1</sup>Ibid., p. 185.

<sup>2</sup>This was explicitly recognized by the Council, Annual Report, 1967, p. 123: "The possible applicability of these exceptions has been less emphasized." On the strengthening of the Council's rules, see also John Sheahan, The Wage-Price Guideposts (Washington: The Brookings Institution, December 1967), pp. 21-24.

<sup>3</sup>Annual Report, 1964, p.114, table 20, col 2.

this procedure for estimating productivity changes was to lead to embarrassment in 1966,<sup>1</sup> the 3.2% became the administration's explicit line of defense.

As pressures on the guidelines grew with the upward creep of prices, the Council tended to retreat from the qualifications in their earlier reports of 1962 and 1963. No longer was there a rather relaxed view that prices could and should move up in those industries whose productivity rose at less than the economy-wide average, with compensatory cuts in high productivity industries assuring overall price stability; on the contrary, the Council apparently became committed to the proposition that there was a prima facie argument against any price increase unless a very strong positive case could be made.<sup>2</sup> The elimination of upward price movements would imply a low degree of relative price flexibility; yet changes in relative prices perform an important function in a market economy. The guidelines had thus

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<sup>1</sup>Because the 1961-65 figure was 3.6%, which the Council considered to be an unusually high figure resulting from the extended cyclical expansion; it therefore recommended the continuation of the 3.2% guideline (Annual Report, 1966, p. 92), much to the disgust of labour leaders. On the labour reaction to this switch in the rules, see Sheahan, op. cit., pp. 47-49.

<sup>2</sup>Annual Report, 1967, p. 126. See especially the second complete paragraph.



become a very short-run policy, aimed at dealing with an immediate and pressing problem.

One interesting aspect of this U.S. experience with the wage-price guideposts is that the progressive tendency towards simplification did not arise because of a lack of sophistication on the part of the Council: the Council presented its most complete and detailed outline of the issues in the initial 1962 statement. Rather, the simplification was apparently a natural result of the pressures on the guideposts.

Apart from this general problem of progressive simplification which tends to cast aside considerations of adjustment and efficiency, two major objections may be made of the guideposts. In the first place, the guideposts tend to exert the most restraint on the most conspicuous changes. Depending as they do on public pressures and on the exhortations of a very limited group of officials, it is almost inevitable that this should be so. As a consequence, conspicuous producers of basic products--such as steel -- are bound to feel that the guideposts are inequitable; the steel industry is still smarting over its rough handling in April 1962. Similarly, labour leaders are almost bound to feel that the guideposts are unfair to them; collective bargaining, by its very nature, takes place in the glare of publicity, and therefore wage changes are likely to attract particular attention on the part of those committed to the guideposts. (A similar complaint has arisen in Britain. While unions can

see the case for an incomes policy, they object to the tendency which they see for incomes policies to become wage policies, holding down the incomes of workers but exerting no comparable restraint on other incomes.) As there is some presumption that the most conspicuous segments of the economy are those which tend to have relatively high degrees of market power -- and it is the exercise of market power at which the guidelines are after all directed -- this tendency to concentrate on the conspicuous sectors of the economy may not be altogether perverse. It would seem unlikely, however, that market power is associated with "visibility" in any precise manner. The manufacturers of mass-produced but differentiated products, in particular, may possess the market power to raise prices without attracting great attention.

The second problem with guideposts is that they must succeed to a very high degree to succeed at all. Once the line is broken, and prices begin to creep up at any appreciable rate, then a settling for the wages or prices indicated by the guideposts will involve a reduction in the share of the income of the group involved. Indeed, once the price rise approaches the rate of productivity increase, labour will cease to participate in the economic gains flowing from rising productivity if they settle for the wage increases indicated by the guideposts. It is this feature in particular which makes labour feel that the guidelines are stacked against them.

One obvious alternative arises when prices are indeed creeping up; that is to allow wage increases equal to the average productivity increase plus the average consumer price increase. The trouble with this proposal is that, once inflation began, it would be perpetuated by such a rule; in the Council's words, "if all unions -- and other groups in society -- were to succeed in tying compensation to consumer prices, the arrangement would become a vast engine of inflation, which, once it began to roll, would continue to gain speed."<sup>1</sup>

It must be once more stressed that this section has not been a balanced view of the advisability of guideposts -- the basic argument for them is that, in spite of their deficiencies, they are worth the trouble because of the relief they give from the price-employment dilemma.<sup>2</sup> Rather, the objective here has been to point out some of the difficulties with wage guideposts tied to the average productivity change in an economy. In particular, there seems to be an inherent tendency for resource allocation objectives to be lost in the effort to achieve price stability. In addition, the guideposts tend to break down after

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<sup>1</sup>Annual Report, 1967, p. 129.

<sup>2</sup>Evaluations of the guideposts may be found in John Sheahan, op. cit., and George P. Schultz and Robert Z. Aliber, eds., Guidelines, Informal Controls and the Market Place (Chicago: University of Chicago Press, 1966). (See, in particular, Robert Solow's essay, "The Case Against the Case Against the Guideposts.")



prices have begun to creep up, leaving "conspicuous" groups in the society (and particularly labour) with an aggrieved feeling.

F. Parity for Canadian Industries Whose Productivity Equals U.S. Productivity.

As noted in the introduction, much of the parity discussion has centered around the relative productivity of the Canadian industry and the comparable U.S. industry. If the productivity in the Canadian industry is equally high, then it may be argued that the Canadian industry is able to pay parity wages; on the other hand, if the Canadian productivity falls below U.S. levels, it may be argued that the Canadian industry simply cannot afford to pay parity wages.

Two broad points are relevant in evaluating this line of thought, which, in effect, bases relative wages in a specific industry on the relative productivities of the industry in various geographical locations. First, questions arise regarding the defects of any simple productivity concept as a basis for determining ability to pay parity wages. Second, the establishment of ability to pay parity wages is not the same thing as determining desirability of parity; at issue here are the overall efficiency of resource allocation, and, in particular, the dangers which single-industry productivity measures pose for the efficient geographical specialization of production.

Because labour productivity is closely associated with the

amount and quality of capital equipment with which labour works, the productivity measure relevant for the parity discussion is not a simple one. Canadian industry which was in an intrinsically inferior position to the comparable U.S. industry might possibly reach average levels of U.S. productivity by the application of greater amounts of capital in Canada than is the case in the U.S. Thus, the simple illustration that average output per man hour in the Canadian industry is equal to that in the U.S. industry does not get us very far in the parity discussion: it is possible that some intrinsic Canadian disadvantage might be made up with more capital.

In spite of this logical difficulty, however, there is reason to believe that a Canadian industry whose average labour productivity equals the level in the corresponding U.S. industry is probably in as good a general productivity position as the U.S. industry, and that the explanation of the Canadian performance does not lie in greater capital input. In Canada, the price of capital (both interest rates and the prices of machinery) tend to be higher than in the United States, while the cost of labour is generally lower. Thus, it is in general to be expected that Canadian producers will use less capital per worker than the comparable U.S. industry; hence, where Canadian average production equals that in the comparable U.S. industry, it is unlikely that the explanation lies in a greater quantity of capital applied in the Canadian operations.

Unlikely, but unfortunately we cannot be sure simply on the basis of logical deductions. Once again, it is important to recognize that we live in a dynamic, changing economy which does not correspond exactly to general equilibrium expectations. In particular, while it might be true that newly installed productive processes in Canada use a higher labour/capital ratio than newly installed processes in the same industry in the U.S., observed data on actual production include, not just newly installed processes, but ones inherited from the past. If newly developed processes are more capital intensive than older processes, and if the Canadian industry is newer than the U.S. industry, then there might well be a higher capital/labour ratio in Canada. Alternatively, a higher capital ratio might occur where the U.S. industry is newer, and new processes are less capital intensive than old.

While this complication should be taken into account if a detailed study is being done of a specific industry, it is not unreasonable to proceed on the basis of the general presumption that, where average Canadian labour productivity is as great as U.S. productivity in the same industry, then this may normally be attributed to the intrinsic strength of the Canadian industry, and not to a higher capital/labour ratio in Canada.<sup>1</sup>

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<sup>1</sup>The general empirical evidence is not entirely conclusive. In our Free Trade Between the United States and Canada (Cambridge, Mass.: Harvard University Press, 1967), pp. 183-85, data is presented which indicate that, while the capital/output ratio is

Where the physical productivity of a Canadian industry equals that of the corresponding U.S. industry, the Canadian industry will be in a position where it is able to pay parity wages -- that is, wages which meet exchange-adjusted parity standards and not just apparent parity -- subject to a number of conditions. These conditions relate to the relative net prices at which the Canadian output can be sold, and to the relative costs of inputs other than labour.

1. If the net price of the Canadian product (adjusted for the exchange rate) is higher either because of Canadian protection, or because Canadian producers have an advantage in transportation costs, then this may make it possible for a Canadian producer to pay a wage even

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higher in Canada, the capital/labour ratio is lower than in the U.S. In his Prices, Productivity ..., p. 10, Lithwick presents evidence that the "level of capital per worker in Canadian manufacturing is substantially higher (29 percent) than in the United States." However, he elsewhere (p. 9) finds that "the higher level of income per worker ... in the United States is entirely explained by the higher level of capital per worker."

At any rate, even if this sort of aggregate data were completely unambiguous, it would not clear up the problem before us, since we are concerned here with atypical Canadian industries, i.e., those whose average labour productivity is as great as the corresponding U.S. industry.



higher than the U.S. wage. On the other hand, if part of the market for the Canadian product is in the United States, and if the Canadian producer has to pay higher transportation costs and/or absorb U.S. tariffs, then the price which the Canadian producer receives will be less than the U.S. price, and a Canadian producer who pays U.S. wages will be at a competitive disadvantage. In this regard, it is interesting to note that several industries in which Canadian wages compare most favourably with U.S. wages -- such as pulp and paper and some sectors of mining -- are natural export sectors with productivity close to or even perhaps greater than in the U.S., and with low or nonexistent U.S. tariffs.

2. The cost of attracting monetary capital into Canadian industry is generally higher than in the United States. This is clearly true with respect to interest rates, which are almost uniformly higher than in the U.S.; for equity capital, the case is not so clear, as evidence is much more difficult to obtain and evaluate. At any rate, a Canadian industry whose physical productivity was identical with that in the U.S., whose final (exchange-adjusted) prices were the same, and which used the same amount of physical capital (per man) as was used in the United States, might not be in a position to pay full (exchange-adjusted) parity; in doing so, it might find it difficult or impossible to

attract and hold monetary capital in the more expensive Canadian market.

3. Even with equal physical productivity, the Canadian producer might operate under the disadvantage of relatively high prices for physical inputs such as machinery and semi-finished materials. Once again, he would be at a competitive disadvantage with respect to his American counterpart. On the other hand, lower input prices would, of course, give him a competitive edge.

It is obvious that some of the above factors may work to the advantage of Canadian producers, while others work to his disadvantage. It is also clear that these are matters of degree, and that some industries may be able to approach parity wages without being able to pay full parity. All the above conditions may be reduced to one: if an industry is making above-normal profits, then it is able to pay higher wages than at present without having to raise prices, and without capital leaving the industry.

Productivity, if measured sufficiently carefully, is the major basis for determining the ability to pay parity wages. There is one extension of this proposition which is of considerable logical significance in the general argument for higher wages, of which the parity argument is, of course, a facet. This extension suggests that it is not just actual, but potential

productivity which is important. The argument, simply stated, is that higher wages provide a challenge to management, and they respond by accelerating their efforts towards increased efficiency. Thus, wage increases (partly?) justify themselves in terms of higher productivity, and there is a net economic gain from the wage increase, since it is not simply reflected in an (equivalent?) decrease in returns to other factors or in a rise in final prices. In Paul Norgren's words:

If the collective pressure on wages and labour costs is kept within reasonable limits, it should act as a stimulus to Canadian managements to introduce more efficient machines and to discover and adopt more economical production methods. The increased product per unit of labour resulting from the innovations will enable them to raise wages, and at the same time maintain profits at a level that will attract the investment funds needed to finance further improvements in equipment and methods.

Such a development would not only benefit organized wage earners in Canada, but Canadians generally....<sup>1</sup>

Where wage increases do indeed stimulate efficiency, this Toynbee-like challenge and response proposition comes close to being a conclusive case for such wage increases, provided that the proposition is made subject to a number of important qualifications. First, the efficiency must represent an increase in the productivity of a given level of resources and not simply

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<sup>1</sup>P. H. Norgren, "The Labour Union Link between Canada and the United States," in A.E. Kovacs, ed., Readings in Canadian Labour Economics (Toronto: McGraw Hill, 1961), p. 41. Norgren's points are discussed in John Crispo, International Unionism, A Study in Canadian-American Relations (Toronto: McGraw-Hill, 1967), pp. 205-6.

involve an increase in average labour productivity resulting from an increase in the use of capital per man. It is normally to be expected that, when the price of labour rises, capital and other factors of production will be substituted for labour in the productive process. Although the per man hour productivity in the industry in question will rise as a result, such an increase in the use of capital per unit of labour does not necessarily represent an increase in efficiency for the economy as a whole. An industry's substitution of capital for labour will, in itself, tend to increase the overall efficiency of an economy only in industries where the ratio of the marginal productivity of capital to the marginal productivity of labour was initially higher than in the rest of the economy. There is a general presumption -- but no conclusive case<sup>1</sup> -- that this condition is likely not to be fulfilled in the industries of initial high (adjusted) wages.

Even in situations where an increase in wages leads to a more efficient use of a given level of resources, and not simply to a rise in the capital/labour ratio, a second condition must be recognized before the challenge-response proposition is accepted as a strong case for wage increases. A heightening of the strains on management, while it may lead to increases in productivity, may also increase the number of ulcers and generally make life miserable for management. Ulcers for management

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<sup>1</sup>Because of imperfections such as those in the capital markets.



are logically similar to risk and irksomeness of work for the labourer; just as an increase in measured national income which involves a switch of workers from safe to risky jobs may be partly or wholly illusory, so an increase in productivity which increases the strain on management may also be considered partly or wholly illusory when we look behind measured production to consider the more ultimate objectives to be met by the economic system.

In spite of these two fundamental reservations, it must be recognized that the challenge-response theory provides a very strong argument indeed for wage increases, provided that management does, in fact, respond with increases in efficiency. But in the interpretation of factual data once again the argument becomes difficult to evaluate.

The ability of firms to pay parity wages is an important aspect of the parity question. But it is not the only important issue. As noted earlier, demonstration that a firm is able to pay parity wages is not quite the same thing as demonstrating that parity wages are desirable. In considering desirability, the question of economic efficiency becomes important. The proposition that the productivity of a single industry provides a questionable base for the determination of wage rates was put forward in the latter half of section C above; the problem with wages based on single-industry productivity is that they tend to undermine the basis for mutually-advantageous interregional

and international specialization. Specifically, relative (regional) wages based on the relative regional productivities in a single industry will tend to eliminate the competitive advantage of industries in generally low-wage areas which are equally as efficient as the comparable industry in high-wage areas, and in which, therefore, the poorer region should specialize according to the proposition of comparative advantage.

Throwing cold water on parity wages for equally productive industries in generally low-wage areas might appear to constitute an anti-labour argument; this is not so, however, for two reasons. First, the argument is formally neutral. It might seem that it is anti-labour to argue on resource-allocation grounds that wages in a specific industry in a low-wage area (A) should be lower (and profits higher) than wages (and profits) in the same industry in the generally high-wage area (B), even though labour productivity in that industry is in some sense equal in the two areas. Similarly, it might be concluded that it is pro-labour to argue that wages should be higher and profits lower in (B) than in (A) in industries of equal productivity. Yet neither the anti-labour nor the pro-labour conclusion would be justified: there are really not two propositions, but only two different ways of looking at precisely the same, neutral proposition. A second, and much more important, reason is this: labour receives the major share of the national product, and therefore has the most to gain from a general increase in

efficiency which may be expected to flow from interregional and international trade: therefore, labour as a whole has the most to lose from moves which interrupt interregional or international specialization. This second point will be dealt with in greater detail in the following section.

G. Rules of Thumb: "Parity of Wage Differentials" as an Additional Consideration

Several possible guides for wage changes, and some of the problems associated with them, have been discussed thus far. It is appropriate at this point to summarize the list of possible guidelines, and to raise the question of whether all the important considerations have been included in the public debate.

In Table II, the main points of our earlier discussion are presented. (The "Problems" noted in the final column are not intended to constitute a comprehensive list.) One complicating feature of guidelines is that they involve more than one major objective. Wagemaking has an influence not only on the average price level, but also on resource allocation and incentives for efficiency. In the prevention of inflation, the average level of wages is an important consideration; the pattern of wages among industries is a strategic variable for the promotion of incentives and the improvement of the allocation of resources in an economy. In any specific negotiation, of course, determination of the "target" wage involves judgments not only on the desirable average level of wages for the economy as a whole, but also

TABLE II. WAGE GUIDELINES

Broad Issue	Objective	Possible Rule of Thumb	Example	Problems
A. Average Wage Level for Economy as a Whole	1. Price Stability	1. Wage increases to equal increase in productivity for economy as a whole.	U.S. CEA guideposts as they worked out.	1. Difficulty once inflation has started. Also how about - (ii) Incentives to increase productivity (iii) Dynamic allocation
	2. Efficient equilibrium allocation; in particular, achievement of desirable interregional and international specialization.	2. The competitive pattern: equal basic wage across economy, with adjustments for risk, pleasantness, training, etc.		(i) The computation of adjustments (ii) Dynamic allocation?
	3. Efficient dynamic allocation	3. Industries (or areas) where there are shortages of output or labour to have an increase in wages relative to industries (or areas) where unemployment or excess capacity.	U.S. CEA guideposts originally intended to be a combination of this and rule #1 along with some reference to #2 and #4.	Difficult to judge desirable degree of relative wage change.
C. Combination of A and B.	4. Incentives for efficiency of individual industries	4. Wage changes of single industry to reflect changes in productivity in that industry.	In Canada, where related to parity discussion. Also related to farm "price parity" issue.	If taken in extreme implies all of productivity gain should go to industry in question.
	5. Stability of present industrial structure at least insofar as it may be upset by international competition.	5. Relative Canadian/U.S. Wage to depend on relative Canadian/U.S. productivity in the industry in question; parity wages in industries where Canadian productivity at U. S. levels.	Apparently basis of statements of labour and management on parity question.	As for rule #4. Also unfortunate consequences for international specialization.



on the desirable pattern of wages among industries. In practice, one of these points may be submerged by emphasis on the other. In the U.S., for example, the original statement of the guideposts included both average wage-price recommendations (rule #1 in Table II) and adjustments in wage (and price) patterns in order to promote dynamic efficiency (rule #3); in addition, some reference was made to the need to provide incentives for efficiency in specific industries (rule #4) and to adjust for differences in past bargaining strength (i.e., to come closer to the competition pattern of rule #2).<sup>1</sup> Under the pressure of events, however, wage-price patterns were increasingly ignored in the emphasis on the objective of stability of the average price index. In effect, of course, this involved an implicit decision on the pattern issue: insofar as the average productivity guideline was adhered to, wages became more or less solidified in their existing patterns.<sup>2</sup>

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<sup>1</sup>See above, pp. 37-38.

The competitive equilibrium solution may be appealed to as a means of promoting justice as well as efficiency; equity apparently was a consideration of the CEA. As noted in our opening pages, we are paying relatively little attention to the important but difficult question of the equitable distribution of income.

<sup>2</sup>If a balance of payments crisis creates a pressing need for a rapid and dramatic improvement in the international competitive position of a country, simply eliminating inflationary

If guidelines are to apply to anything but a very short time period, such a submersion of the efficiency question becomes a matter for grave concern; in the longer run, it is most important that rule #1 be tempered with rule #3, and, to some degree, also by reference to #2 and #4.

Insofar as the government may deem it desirable to become involved in the wagenaking process in order to promote domestic price stability and efficiency, it is thus important that consideration be given to all of the first four rules. Such a recommendation, of course, raises the vexing problem which caused so much trouble in the United States: the more complex and inclusive guidelines become, the more difficult they become to interpret. Thus, the less they are able to serve as a source of clear guidance.

Ideally, it would perhaps be desirable for Canadian wage policies to be set on the basis of domestic conditions and domestic needs; it is not clear that reference to U.S. conditions should on any fundamental grounds play an important part in Canadian wage negotiations. It is true that Canada, as an open economy, needs to consider balance of payments consequences of

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wage increases may be considered inadequate. A fall in the labour cost per unit of output may be considered desirable; hence, the recommendation in Britain for a "wage pause." Such a pause, if general, would also obviously tend to freeze the existing pattern of wages.

wage policies, but the balance of payments may reasonably be expected to take care of itself if success is achieved in the domestic goals of price stability and increased efficiency. Nevertheless, realities must be recognized: exposed as Canada is to the flood of information across the border from the South, it is perhaps inevitable that references will be made to U.S. wage rates during Canadian collective bargaining. Certainly the issue of parity with the U.S. has in fact become a lively topic in Canada.

As it is not possible to exorcise U.S. information from Canadian debate, and as it thus may be considered more or less inevitable that continuing references will be made to relative Canadian/U.S. productivity as a criterion for appropriate wage levels in specific Canadian industries (possible rule of thumb #5), it has been important to dwell at some length on the drawbacks of this rule. In particular, it will be recalled that an application of such a rule would tend to undermine the basis for international specialization. (Or, where the parity issue is applied regionally, such as to relative Quebec-Ontario wage rates, the application of such a principle would tend to undermine regional specialization.)

The appropriate antidote for this problem is to elevate the competitive pattern as a criterion (#2); such a pattern promotes efficient regional and international specialization, provided that it is not so comprehensively applied as to hamper the dynamic adjustment of the economy. This last proviso is, in

practice, of limited importance: the practical difficulty seems to be not an excessive appeal to the competitive model, but rather an almost total absence of references to the competitive pattern.

Given the prominence of the competitive model in the writings of economists, its relative absence in the discussions of practical men of affairs -- whether on the management or labour side -- may seem strange. It can, perhaps, be explained on three grounds. Practical men are, of necessity, driven to concentrate on their own industry and its particular problems. Thus, in wage bargains, it is natural to appeal to the state of their own industry, in terms of principles 3, 4, or 5 in Table II. Secondly, labour leaders are obviously interested in the use of their market power as a means of offsetting the market power of employers and protecting the workers share of income, and the competitive model does not provide for the use of power by labour unions. Thirdly, while differentials in competitive wages due to such complications as differences in risk, pleasantness, training, etc. may in economic theory be relegated casually to footnotes, in practice they are the heart of the matter; and they are not easily estimated.

Once appeal to the American pattern is made -- as it is in the parity discussion -- this practical problem may be dealt with, and provision made for regional and national specialization similar to that which would occur in the competitive model.



(In the competitive model, of course, as in the actual Canadian-U.S. situation, international allocation of resources is influenced by tariffs. The tariff structure is taken as given in this study, and the question of efficiency is considered within the context of present tariff arrangements.) As a counterweight to the single-industry productivity criterion (#5), a rule of thumb may be proposed to promote regional efficiency, as in the competitive model, while at the same meeting the labour leader's objection that an application of the competitive model itself would deprive labour of its bargaining power.

Suppose that the wage in a specific industry -- let us say electronics manufacturing, for example -- is under consideration in a specific area -- let us say Canada (or Ontario). The rule of thumb suggests that a first approximation to the appropriate wage is a wage which exceeds the average wage in Canada (or Ontario) by the same degree as the electronics wage in the comparison area (the U.S.) exceeds the average wage in the U.S. Thus, if the electronics wage in the U.S. were, let us say, 20% above the average U.S. wage, the basis for initiating discussion of the electronics wage in Canada (or Ontario) would be a wage 20% above the average Canadian (or Ontario) wage. Thus, a parity of differentials would be taken as a starting point. This rule of thumb is not without fuzziness, of course: one problem lies in the "appropriate" region for comparison. (Should wages in the whole U.S., or just in the

Great Lakes region be considered as the basis for comparison in discussion of wages in Ontario?) However, it does have a number of very desirable attributes; most conspicuously, it does not interfere with efficient regional specialization.

As compared to the problems which might arise if an abstract notion of the competitive equilibrium were taken as a starting point, the parity of differentials avoids the necessity of making specific calculations for differences in risk, skills, irksomeness, and so on. Provided that the degree of risk, say, in the U.S. mining industries are more or less comparable to that in Canadian mining, and assuming that U.S. wage negotiations make allowances for these risks, then the parity of differentials concept would also make allowance for the risk.<sup>1</sup> In any absolute sense, of course, this solution is not altogether satisfactory, as there is no assurance that the degree of risk

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<sup>1</sup>While the parity of differentials concept is based on the assumption that the characters of the U.S. and Canadian economies are similar in the sense that, if mining is a risky job in the U.S. it is also likely to be risky in Canada, it does not assume that the structures of the economies are similar in the sense that if a specific industry constitutes 5% of U.S. production, it is also likely to constitute 5% Canadian production. On the contrary, the parity of differentials concept is aimed at efficient regional specialization; regions will tend to specialize in their products of comparative advantage (within the context set by tariff policy.)

(or irksomeness, or skill) in the Canadian industry is precisely the same as in the U.S. industry. Nor is it necessarily appropriate for decisions on these matters in Canada to simply follow the U.S. lead. However, as the parity of differentials is meant as a starting point rather than as an inflexible rule, these criticisms lose some of their force.

Likewise, the parity of differentials provides for a return to the power of labour, provided once again that the characteristics of the industry in Canada are somewhat similar to those of the U.S. industry. Indeed, the case can be put much more strongly; the parity of differentials is a good starting point if the objective is to maximize the returns to labour.<sup>1</sup> In discussing the interests of labour, it must be recognized, of course, that labour is not a homogeneous mass with only one precisely defined objective. On the contrary, U.S. electronics workers, for example, have an unambiguous interest in high wages for Canadian electronics workers, and the higher the better: high Canadian wages will both strengthen their case for high wages in the U.S. and tend to protect their jobs from Canadian competition. In contrast, the interest of Canadian electronics workers in high Canadian wages is more ambiguous: they are

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<sup>1</sup>It must be stressed, however, that this does not mean that it is against the general interest of management. The benefit to labour discussed below is connected to the gains from efficient regional specialization; management likewise has a stake in efficiency.

clearly likely to want "more", but have an interest in not pushing for so much more that Canadian goods will become uncompetitive and they will lose their jobs. But this possible difference in the interests of various segments of labour will be ignored for the moment.

The "market power" gain from the unionization of an industry is certainly not the whole wage -- there can be no doubt that, in the very productive North American economy, wage rates in the absence of unions would be very high by any historical or national comparison one wishes to make. Rather, the "market power" gain lies in the difference between what the union worker makes in the industry in question and what he could make in alternative employment (of equal pleasantness and requiring equal skill). Thus, from the union point of view, the objective may be seen as one of maximizing this differential.

Let us now apply this to our interregional problem. Suppose that in the central region, the average industrial wage is \$4.00, while the wage in the particular industry is \$5.00. Suppose also that the average wage in the "outlying" area is \$2.00. The question is, if an interregional (international) union wishes to maximize the gains to its constituents, what wage should it aim at for the outlying area? The parity of differentials principle suggests that the wage aimed at should be 25% higher than the average wage for the region, just as it is



in the central area. Thus, the wage aimed at would be \$2.50, or 25 per cent more than the \$2.00 average. Having settled the interregional differential, the union could then press for as much increase across the board as it felt it could get: i.e., it could push for as great an increase in the overall 25 per cent differential as it felt it could extract from the employers.<sup>1</sup>

It is quite true that the lower wage of the outlying industry might<sup>2</sup> induce firms to build their new plants in this area rather than in the central area. However, although the workers in this area and industry would be receiving only \$2.50 rather than the \$5.00 of the central region, it may be argued that workers as a group would not be hurt by such a decision. The loss of potential new jobs in the center would "cost" workers there a fifth of their potential income from new jobs, since their alternative would be a \$4.00 job; the workers in the outlying area would, however, gain a similar proportion from their new jobs, since their alternative to the \$2.50 wage would be only \$2.00. In other words, the gain which a worker

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<sup>1</sup>Joint U.S.-Canadian bargaining is not, of course, the normal bargaining procedure. In order to simplify the discussion, we skip over this important factual point.

<sup>2</sup>But this is not certain. The advantages of the center might more than offset the wage disadvantage to employers, making the center the more attractive location for expansion.

gets from the power provided by the union is not the total wage by any means: rather, it is the difference between his actual wage and the wage he could make in the absence of the union.

If the union makes interregional wage equality a major bargaining objective, it may result in a location of new plants which is inferior in an important respect to that which would have occurred if the wage differentials rather than the wages themselves were equated: as a consequence, the total gain to the worker from union activity may be lessened by an insistence on such equality. This may be illustrated by a somewhat more complete and complicated illustration than that provided above. Suppose we begin with the above example, and assume that initially wage differentials are equated, with wages at \$5.00 in the industry in question in the central areas, and at \$2.50 in the outlying areas. Suppose, in addition, that there are already 1,000 workers employed by a corporation in the central area, and 100 workers by the same corporation in the outlying area. Suppose, also, that a current round of wage negotiations is under way, and that, after these negotiations are completed, a new plant employing 100 workers will be built, its location to depend in part on the outcome of the wage negotiations. Suppose, finally, that the advantages of locating in the central area are equivalent to \$1.00 per hour, so that if the regional wage differential is greater than this figure, the plant will be located in the outlying area.

A demand for wage parity in the labour negotiations is presumably an alternative for some other possible request. The union, naturally enough, will be trying to get the biggest package it feels it can extract from the management, and push-on the parity question presumably will mean that compromises may have to be made elsewhere. Presumably, therefore, it is in the union interest to see that, for every gain extracted for the benefit of workers, the profit position of the company is lowered as little as possible, so that the company will still be in a position where the union can make additional claims.

Let us now look on the parity question in terms of its relative gains for the worker and costs for the company. Inter-regional wage equality would involve an increase in earnings of \$2.50 per hour for the 100 workers in the outlying area,<sup>1</sup> or a total of \$250 per hour. For this group, the cost to the company -- \$250 -- will be equal to the gain to workers from the move to parity. In addition, parity will result in the new factory for 100 workers being built at the center, with its \$1.00 basic advantage, rather than in the outlying area. Although a different set of workers will be involved, the total (proportionate) gain to those employed by the new factory will

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<sup>1</sup>For simplicity it is assumed that sunk costs are sufficiently great to prevent a flight of existing plants from outlying areas in the event of parity. Where such is not the case, the argument presented below will be strengthened.

be unchanged by the move to parity and the resulting shift in location of the new factory. That is, the new factory will result in a gain of 25% in the incomes of 100 centrally-located workers: they will be able to make \$5.00 per hour, in contrast to the \$4.00 they could make in their alternative jobs. If parity of differentials existed, rather than equal wages, a similar gain would have come -- the plant would have been built in the outlying area, employing 100 workers at \$2.50 per hour, or 25% more per hour than they would have been able to make in alternative jobs. This shift in the location of the new factory is a matter of indifference to labour as a whole, but is not a matter of indifference to the company. Their profits would be \$150 per hour higher without parity -- after accepting parity, they would hire the 100 new workers at \$5.00 per hour rather than \$2.50 per hour, from which the basic advantage of the central area of \$1.00 per worker would have to be subtracted. Thus, if the union had taken their original parity demand -- initially costing \$250 -- in a form other than parity, without the extra \$150 penalty on the employers, presumably they would be in a better position to make additional demands on the employers.

Wage equality in this case would operate towards a reduction in the total gain from the economic activity of this industry -- in terms of wages in excess of those in alternative employment and in terms of profits. As the ability of unions



to push for higher wages is associated with the profitability of industry, this reduction should be a matter of concern to workers.

In brief, where reference is made to U.S. wages in Canadian negotiations -- as it obviously is in the parity discussion -- then it is important that the parity of differentials concept be stressed. It is true that it is not an all-inclusive guide which should be mechanically and rigorously adhered to; in particular, the desirability of stimulating efforts towards efficiency within industries makes some reference to productivity of the industry or firm desirable. As noted, earlier, however, there is a natural tendency for participants in collective bargaining to pay close attention to conditions in their own industry, and there is therefore little danger that productivity in the industry in question will be completely eliminated as a consideration in the final settlement. What is important is that the issue of regional efficiency be given consideration; the parity of differentials concept therefore is an appropriate starting point where references to U.S. conditions and wages are expected to play a prominent role in prospective bargaining.

As stated earlier, however, it is not clear that Canadian negotiations should be dominated by conditions in the U.S.; Canadian rather than U.S. conditions are of primary relevance in the determination of Canadian wages. If wage guidelines are

considered desirable, we would, therefore, ideally recommend a combination of the first four rules (Table II), with stress on #1 and #3. Realities must, however, be recognized; U.S. wages are bound to command considerable attention in Canadian wage negotiations. In cases where U.S. wage rates promise to become a central issue in Canadian bargaining, we would strongly recommend that the parity of differentials concept rather than the single-industry relative productivity criterion (#5) be made the basis of reference. To those who seek the certainty of a simple answer, this complex set of recommendations may seem perilously close to the offer of a stone. It should not be surprising, however, that there is no single, simple solution to one of the most intractable - and central - economic problems of our time.

When it comes to applying general principles to specific industries with their peculiar institutional characteristics, problems may of course arise. To illustrate this point, we look at two industries in which there has been a wage parity debate, namely, automobiles and farm implements.

#### H. Wages in the Automotive Industry: Some Questions Raised by the Recent Canadian-U.S. Automotive Agreement.

Thus far, the discussion has been a general one, without relation to particular industries. Because the question of international competitiveness is one of the important elements

in the wage discussion, tariffs, both actual and potential, have a significant relationship to parity. In the next two sections, two industries where special commitments have been made for tariff-free trade are considered -- automobiles and farm machinery. Because both the trade commitments and the nature of the two industries are different, the two industries raise somewhat different questions.

The major objectives of Canada in entering the automotive agreement were basically two: to promote rationalization and efficiency in the automotive industry, and to improve Canada's balance of payments. There seems to be little doubt that the fragmentation of Canadian automotive production in the past, which has resulted from the pattern of the Canadian market and from U.S. and Canadian tariffs, has been a major source of inefficiency in the Canadian industry. Hence, the hope for an improvement in efficiency was well founded. After the period of adjustment to a new pattern of production, it is true that the Canadian industry will be subject to some residual disadvantages compared to the U.S. producers: Canadian automobile assembly plants are somewhat farther from the central sources of automotive parts and from the center of the automobile market than the U.S. assembly lines, and therefore Canadian locations will be at a disadvantage because of higher transportation costs. However, such residual disadvantages are rather small. Since the public information on cost conditions in the automobile

industry is incomplete, conclusions on ability to pay must of necessity be tentative; but as we read the evidence, the 8% exchange rate advantage in wage rates for the Canadian automotive locations should be about enough to compensate for the long-run residual disadvantages of Canadian locations in a free trade situation.<sup>1</sup> That is, after a period of adjustment to new conditions, Canadian assembly locations in a free trade market should be in a position to sell at prices competitive with U.S. prices, and to pay wages of approximate parity, provided that parity is interpreted as nominal parity. We must, however, once again stress our lack of confidence in the accuracy of this conclusion because of the difficulty in obtaining and interpreting cost data.

The central questions regarding automotive parity are two: first, how long may the "period of adjustment" reasonably be expected to last, and how should the rising productivity (relative to the U.S.) be divided among labour, capital and the consumer during this period of adjustment; and second, even if parity wages can be paid in the long run, is it desirable that they should in fact be paid?

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<sup>1</sup>Free Trade ..., pp. 224-247. Insofar as there are continuing costs to Canadian car producers associated with Canadian protection, the position of the Canadian producers is somewhat weaker than it would be in the situation of across-the-board free trade discussed in our book.



Needless to say, the "desirable" distribution of the gain is very much a matter of disagreement. It does not seem unreasonable, however, to argue that those who stand to lose from a change in commercial policy should receive some compensation. Thus, a strong case can be made for relocation assistance for any workers displaced by the agreement. On somewhat similar grounds, it can be argued that, where the reorganization necessitates the writeoff of equipment, the profit position should be kept sufficiently strong to compensate for these losses. When we go beyond this, however, to deal with the extra gains coming from the increased efficiency, controversy becomes much more heated.

One of the difficulties in working through the distribution problem is that, not only are the economic questions themselves knotty, but the discussion must take place within the limits set by attitudes on commercial policy. The efficiency gain depends on the free trade agreement; the continuation of the agreement depends in part on the political forces within which the two national governments operate: and relative wage, price and profit trends in Canada and the U.S. can influence these political forces. In our opinion, the greatest danger to the continuation of the agreement lies on the American side, where general protectionist pressures associated with U.S. balance of payments problems are complicating a situation where there was already some resentment in the U.S. over the automotive agreement. In particular, some felt that the agreement

was not considered with due deliberation, but came about as a result of the pressures on U.S. policy created by the Canadian automotive export incentive programs in 1962-63. Furthermore, as the major effect of the agreement lies in an increase in Canadian efficiency, and therefore the gains of the agreement go primarily to Canada,<sup>1</sup> it is on the U.S. side that the lesser incentive to continue the agreement lies. Thus, in considering the distribution of efficiency gains in Canada, it is relevant to look on the effects of this distribution on the willingness of Americans to continue the agreement.

As we see it, the major source of friction over the agreement lies in the continuing automotive price differential between Canada and the U.S. As long as this exists, it is likely that the opinion will be expressed in the U.S. that the agreement really does not involve free trade in automobiles, but rather is an extension of earlier plans to promote Canadian automotive exports to the U.S. Thus, there is a very strong argument for giving automobile price reductions a very high priority in Canada. A reduction in Canadian prices to U.S. levels would

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<sup>1</sup>It is true, however, that all the efficiency gains in the Canadian industry need not go to Canadians. In particular, since the Canadian auto industry is substantially owned in the U.S., increases in Canadian auto profits would go to a significant degree to the U.S.

also make possible the modification or dismantling of the Canadian production floors which have been a major source of resentment in the U.S.<sup>1</sup>

If, for the moment, we put aside the question of price adjustments, and deal with the division of gains among wages and profits, we come back to the two major criteria mentioned in earlier sections. First is the ability to pay, depending on the productivity of the industry in question. From the viewpoint of the overall economy, single-industry productivity as a basis for wage changes has an advantage in that it increases worker efforts towards efficiency. Earlier in this section, we presented our conclusion that the Canadian automotive industry would probably be able to pay wages of nominal parity -- although again it must be stressed that this conclusion was very conditional, and, at any rate, was applicable only to the longer-run period after substantial adjustment to free trade has taken place. But there is the other line of argument, and a very strong one, that wages should be based, not so much on the productivity of the individual industry, but rather on the productivity of the economy as a whole. This argument gives

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<sup>1</sup>On the other hand, an argument may be presented that wage parity should be given precedence over price reductions in Canada. See our "Automotive Agreement of 1965," Canadian Journal of Economics and Political Science, May 1967, p. 284.

great weight to the efficient regional specialization of production, and from it was derived the "parity of wage differentials" concept.

On the basis of the principle of comparative advantage, there is an economic argument that, as time passes and Canadian productivity in automobiles approaches U.S. levels while productivity in the rest of the Canadian economy trails significantly behind U.S. levels<sup>1</sup>, then Canada will have a comparative advantage in automobiles, and, from the viewpoint of international efficiency, the Canadian automotive industry should expand relative to the rest of the economy. If this line of argument is accepted, it would follow that profitability in Canadian automotive manufacturing should be higher than in the U.S. in order to attract capital for expansion, and thus, Canadian wages should approach U.S. wages at a slower rate<sup>2</sup> than

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<sup>1</sup>It is assumed here that there is no further change in commercial policies. The productivities which might exist in Canada in the event of a general reduction in tariffs are not considered germane to this study.

<sup>2</sup>Again, this may be considered to be an anti-labour position, but it should be recognized that it has an equally valid other side: U.S. auto wages should be sufficiently higher than Canadian auto wages that the U.S. profitability will lie below Canadian profitability, with the result that there will be an incentive to expand in Canada.



Canadian productivity approaches U.S. productivity.

But at this point, the potential political aspects must be again considered. The U.A.W. in the United States can scarcely be expected to look upon the relative decline of the U.S. automotive industry with indifference, although, if Canadian expansion is moderate and takes place within the context of a generally growing North American automotive market, there need be no actual contraction, and a rapid rate of Canadian expansion can take place without a decline in U.S. production, but rather simply with a slowing of the rate of growth in the U.S. industry. (Several points might be noted as asides here. First, the general weakness of the U.S. automobile market in the years since the agreement have tended to increase U.S. sensitivity to Canadian expansion. Secondly, producers of parts as well as the union may be concerned with protecting their position from Canadian competition; this point does not, however, apply to the assemblers as they are international corporations who presumably would be delighted to have high profit rates in Canada.) The obvious way for an American union to protect itself from low-wage competition is to press for parity in Canada. (This is not to suggest that the desire to protect itself from Canadian competition is the only motive for U.S. labour support of auto parity; at least as important presumably are general attitudes towards labour co-operation in pressing for higher wages.) In addition, it may

be argued that Canadian comparative advantage in automobiles would in significant measure be the result of the pattern of North American protection, and that, therefore, suggestions that there be an international redistribution of production (as would result from the parity of differentials concept, in contrast to the single industry productivity measure) cannot be adequately dealt with unless consideration is given to the purposes and significance of protection by the two North American countries. This is clearly beyond the scope of this study.

Unfortunately, then, we are left with somewhat ambiguous and uncertain conclusions. Our discussion does, however, point to the desirability of placing a "parity of automotive prices" in a position of precedence in the division of efficiency gains from the auto agreement. Beyond that, and in the long run, it appears the Canadian industry will be able to pay wages of nominal parity or close to it. On the grounds of efficient international specialization, it does not, however, appear entirely desirable that such wages be paid. Insofar as reallocation of production is feasible within the political restraints set by North American protection (and, in particular, within the political restraints within which the automotive agreement may be continued), it is desirable to modify the single-industry productivity measure along the lines of the "parity of wage differentials" concept.

## I. Wage Parity in the Farm Implement Industry.

In spite of obvious similarities between the automobile and implement industries, it has been argued that parity in the farm implement industry must be considered separately than in the automobile industry for a number of reasons:

1. The Canadian automobile industry is very close to the center of the U.S. industry geographically, and has only small disadvantages in terms of access to supplies and to markets. The farm implement industry and market, in contrast, are centered in the Detroit-Chicago area and to the west. Thus, while the present exchange differential of 8% may be enough to offset the relatively small basic locational disadvantages of Canadian automotive assembly plants, the locational disadvantages of farm implement producers are significantly greater.

2. While the Canadian automotive assemblers are subsidiaries of large U.S. corporations whose major markets and manufacturing operations are in the United States, the structure of the Farm machinery industry is different. In particular, of the large implement producers, Massey-Ferguson has relatively much more of its production (approximately one half) in Canada than do the auto companies. Thus, while the automobile companies and the U.S.-based implement companies might be in a good position to absorb a steep jump in their Canadian wage rates by taking a continental view and "spreading the

cost" over their comparatively huge U.S. operations, Massey-Ferguson is not in a position to do such spreading.

3. The automobile industry is in a state of change following the recent move towards an integration of North American production facilities. Thus, the parity question in automobiles involves not only the ultimate long-run ability of the auto companies to pay parity, but also the question of the sequence in which changes will take place, particularly insofar as price and wage changes are seen as partial alternatives. In contrast, farm implement trade has been duty-free between the U.S. and Canada for several decades<sup>1</sup>, and therefore the transitional problems of the automobile industry do not apply to implements, and, in addition, the fundamental ability of Canadian producers to pay parity is more easily evaluated than in the automobile case.

4. The free trade agreement is a conditional one, involving a partial isolation of Canadian prices from U.S. prices. (Only Canadian assemblers can import cars duty free, and in order to gain this privilege, they must pro-

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<sup>1</sup>This is not to say that North American tariffs do not influence the location of farm implement producers. It is sometimes argued that one reason for the concentration of tractor production in the U.S. is that there are advantages in producing farm and industrial tractors together, and tariffs remain on industrial equipment.



duce certain amounts in Canada.) In contrast, the free trade in farm machinery contains no such qualification, leaving Canadian production without protection. Thus, while Canadian car manufacturers can escape some of the profit implications of parity by charging higher prices in Canada, no such escape exists for farm implement manufacturers. That is, they have no "second line of defence," and if parity wages have sufficiently adverse effects on their profit positions, they may consider leaving Canada.

The third and fourth points are basically valid, although it may be questioned whether an automotive free trade arrangement providing for partial price isolation of the Canadian market is a stable one. (That is, while the Canadian production floors provide a short-run competitive escape, Canadian insistence on their continuation may lead to U.S. reservations regarding an extension of the pact.) There are also elements of validity in the first two arguments, although they raise problems of interpretation.

The degree to which the Canadian distance from the center of the farm implement industry puts Canadian locations at a competitive disadvantage (point #1) depends on the nature of the market and of the manufacturing processes. The major issues can be outlined quite simply, although an adequate evaluation would involve a sizable study. Distance from the center of an industry is a disadvantage insofar as the nature of the market and of production methods make it necessary to ship to the central regions or beyond. Setting up a plant relatively distant from

the center is not necessarily disadvantageous if there is a local market to be served from the plant; thus, for example, while the automotive industry has been centered in the Detroit area, there has been some tendency for the auto firms to establish local assembly plants to serve regional markets. Similarly, if there are local sources of relatively inexpensive parts and other supplies, it may not be disadvantageous to locate in an area relatively distant from the center of industry. In general, however, this last point is unlikely to be important in sophisticated manufacturing processes, as suppliers usually congregate near the center of a market. (However, this helps to explain the greater tendency for tractor production, as compared to others for machinery production, to take place near Detroit.)

Ability on the part of noncentral producers to carve out local markets sufficient for profitable operation depends in part on a lack of major economies of scale (relative to the size of the local market). For several reasons, it may be deduced that the ability to survive without competing in the center of the market is more easily achieved in farm implements than in automobiles. The absence of the automobile-type pressures for annual model changes somewhat reduces the need for very long annual production lines. Furthermore, the survival of six major heavy farm equipment producers compared to four automobile producers suggests that the optimum size in farm equipment may be somewhat smaller in relation to the market

than is the case in automobiles.<sup>1</sup> Nevertheless, these differences can easily be exaggerated. The organization of Massey-Ferguson production strongly indicates that there are sufficient economies of scale to make wide distribution of equipment from a single plant very advantageous (thereby putting producers in noncentral regions at a major disadvantage unless they have some offsetting advantage such as lower wages.) Their Detroit tractor plant serves all of North America; similarly, their combine production takes place only in Brantford, and their baler production only in Toronto. In brief, although a categorical answer would require a much more intensive study, the preliminary indications are that, because of the greater distance from the center of the North American industry (and because of its lack of (temporary?) price isolation from the U.S. market) the Canadian farm implement producers are in a poorer position to absorb parity wages than are Canadian automobile producers.

This brings us to the relative ability of Massey-Ferguson

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<sup>1</sup>Also, more than one third of the North American farm equipment market is served by smaller companies. The co-existence of smaller with the large firms is explained by the wide range of items supplied by the industry, some of which are quite specialized. Particularly where equipment is designed for special local soil or climate conditions or for special crops, Canadian producers of such items may be under less competitive pressures than producers of relatively standardized items

to absorb parity wages in competition with producers who production takes place preponderantly in the U.S. (point #2). There is some merit in this argument since, if the Canadian operations are a large fraction of the total for a company, then wage parity will have a proportionately great potential impact on profits. If the change is sufficiently great to involve actual losses, there will be particular pressures on the company to reconsider their Canadian operations. However, aside from the pressures which possible losses would create for quick decisions, the position of the Canadian operations of Massey-Ferguson and the Canadian manufacturing operations of a predominantly U.S. company would be basically similar. That is, if Canadian locations have basic disadvantages which mean that U.S. locations are preferable unless the wage differential is sufficiently great, then parity will provide both predominantly Canadian and predominantly American firms with an incentive to locate new operations elsewhere than in Canada, and, depending on possible alternative uses of existing Canadian plant and equipment, to shift present Canadian operations to the U.S. In other words, while the ability of predominantly U.S. firms to "spread" the increase in Canadian wage costs reduces the pressures on them to make quick decisions, the Canadian wage costs are nevertheless explicitly attributable to the Canadian operations themselves, and therefore, if wage parity puts the Canadian operations at a disadvantage, then the firm has an incentive to escape the need for "spreading" by limiting its Canadian operations. The relative percentage of



operations in Canada does not change this basic proposition. The wage "spreading" argument is essentially incorrect.

It must be stressed that we have done no adequate study of the "ability" of the Canadian locations to bear wages of apparent parity. What we have argued is that there are basic grounds, derived from the overall locations of the North American automotive and farm implement industries, for arguing that the farm implement industry is probably less able to bear parity wages than is the automobile industry. Thus, quite apart from the restraints on exit provided by the conditional nature of the automotive free trade agreement, the potential danger of loss of Canadian industry as a result of parity appears to be greater in the implement than in the auto industry.

Thus far, we have considered only the ability of implement firms to pay parity without leaving the country. Once again, the partially separate question of desirability of parity might be considered. As long as the Canadian industry is able to pay wages which meet parity of differentials criterion, it is one in which production should take place in Canada, from the viewpoint of efficient international allocation of resources (subject to the restraints set by commercial policies). Insofar as the push for wages exceeding those of parity of differentials concept would lead to pressures for the industry to relocate outside of Canada, such higher wages may be opposed on efficiency grounds. Insofar as Canadian producers are deemed to have the ability to pay more than parity of differential wages, the

difficult questions of compromise between the single industry productivity principle and the overall productivity of the economy arise, and they are not much easier to solve in this case than in the auto industry.

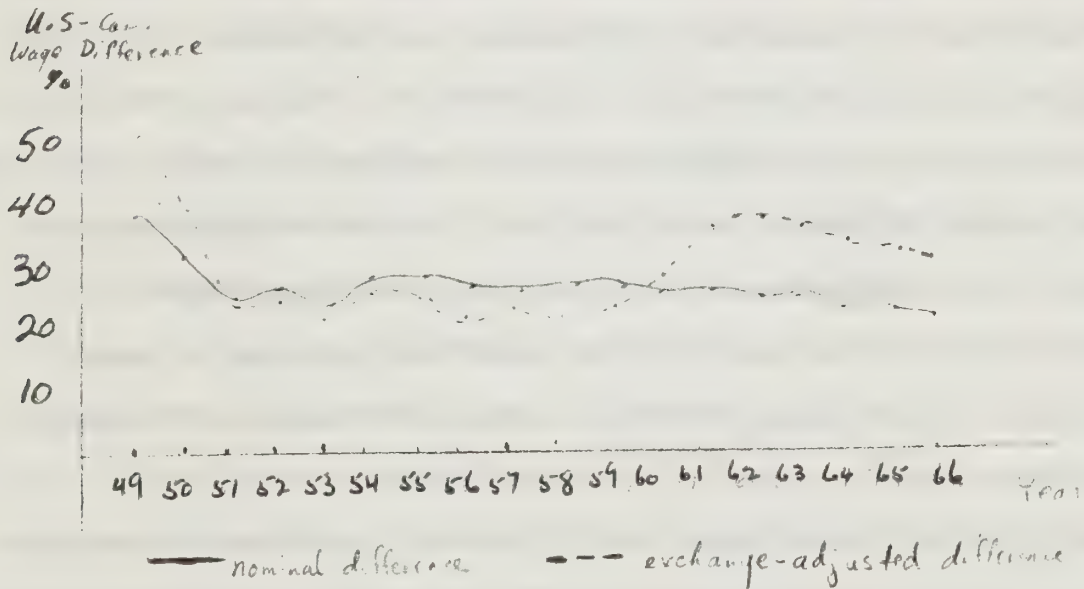


## CHAPTER II

### RECENT TRENDS IN U.S.-CANADIAN WAGE DIFFERENTIALS\*

In the previous chapter, the theoretical issues associated with the possible elimination of U.S.-Canadian wage differentials were discussed. In the last three chapters, data are presented on the quantitative significance of the issue. In the current chapter, simple graphs are shown of the wage gap by industry; in the following chapters, the data on wage differentials are made the basis for calculations of the potential effects of wage parity on prices.

Chart 1 U.S.-Canadian Wage Differentials, Manufacturing Average, 1949-1966



\*The data in this chapter are taken from D.B.S., Hours and Hourly Earnings (72-003); U.S. B.L.S., Employment and Earnings Statistics for the United States, 1909-1966 (Bulletin 1312-4); U.S. B.L.S., Monthly Labor Review.

Annual data on hourly wages are shown on the charts, which provide no information on overtime or salaries.



As may be seen from chart I, the percentage difference in nominal manufacturing wages between the U.S. and Canada has declined since the mid-fifties, although this decline has been at a reasonable slow and steady rate, at least until about 1964. Prior to that time, during the Korean war, the differential showed some fluctuation, and during 1949-50 it had narrowed appreciably.

The wage differential becomes less stable when it is adjusted for the difference in the exchange values of the U.S. and Canadian dollars. The decline of the nominal difference in 1949-50 is accentuated by the rise in the exchange value of the Canadian dollar during that period. During the fifties, the fluctuating Canadian dollar added a degree of variation to the reasonable stable nominal wage differential. With the fall in the Canadian dollar from its 5% premium in the late fifties to a pegged rate of 92 1/2 cents in 1962, the exchange-adjusted wage differential widened noticeably; since that time it has been eroded by the more rapid rise in nominal wages in Canada than in the United States.

In the following pages, similar charts are presented for major industrial groups, among which there are some noticeable differences. Most conspicuous, perhaps, is the tobacco industry, where average Canadian nominal wages exceed those in the U.S., and where the exchange adjusted wages are quite close in the two countries. The deviation of this industry from the overall Canadian pattern is primarily attributable to the concentration of the U.S. industry in the low-wage region and of the Canadian industry in the high wage region of Canada.

At the level of aggregation shown in the charts below, the tobacco industry is the only one in which Canadian workers receive as high(nominal)

wages as in the United States. The more narrow the industrial sector considered, the more likely it is, of course, that an exception will be found to the general pattern of higher wages in the United States than in Canada. Wage parity can thus be found in certain parts of the pulp and paper industry, in sections of mining, and in segments of the steel and steel processing industries. In large part, these special cases of wage parity may be attributable to particularly strong productivity performance in the Canadian industry. In addition, they may also be associated with special institutional characteristics, such as the international agreements negotiated by the Continental Can Company and the Bethlehem Steel Company for its iron ore mine at Marmora. Similarly, international negotiations carried on by the U.S. automobile firms and the U.A.W. in the U.S. have dealt with the question of U.S.-Canadian wage differentials.

This raises the question "What has been the effect of parity wages that have already been achieved?" A formal, technical answer might be "In the absence of equivalent productivity gains they have had an adverse effect on profits, and/or product prices and sales - with possibly adverse consequences on the Canadian Balance of Payments position. On the other hand, to the extent that parity wages have reflected equivalent productivity gains, then there have been none of these consequences; instead the higher income of labour in these industries has been a direct reflection of the increased productive capacity of Canadians." But this is too simple a statement. For example, even in equal-productivity industries, it should be recognized that parity has represented an ad hoc application of a "single industry productivity" guideline, rather than an average productivity guideline. Hence, while the Canadian industry may not have declined, and

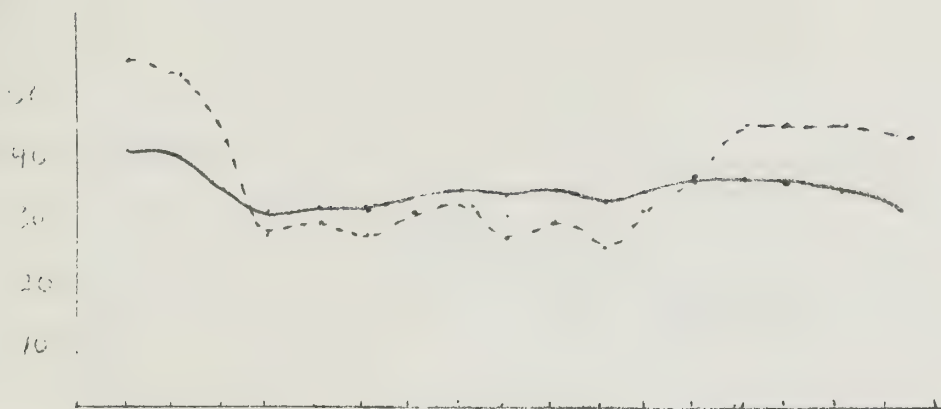
may, indeed, have expanded at a more rapid than average rate, it may still have remained smaller than might be desirable for efficient international specialization.

There is one warning necessary before turning to the comparisons below. Wage differentials may mislead to some extent because of differences in the composition of an industry in Canada and the U.S. As a hypothetical example, there could conceivably be an industry paying identical wages in Canada and the U.S. to any specific classification of workers; yet the U.S. all-industry average wage could be higher because of a concentration of U.S. employment in high-wage classifications. In practice, the error introduced by such considerations is almost certain to be a minor one.<sup>1</sup> Moreover, the problem is not one of bias, since this error is as likely to understate wage differences as overstate them. However, where such differences in industry mix exist, it becomes more difficult to attach real meaning to the concept of all-industry parity.

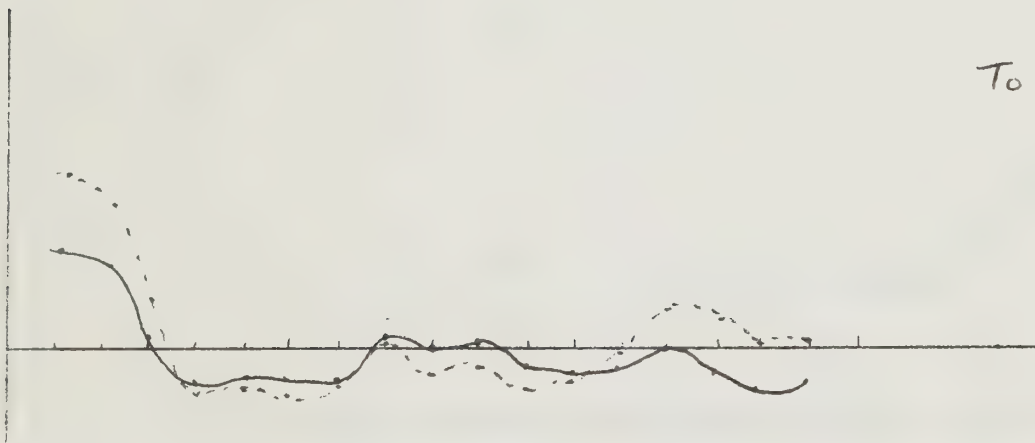
With these caveats in mind, we now turn to the industry wage comparisons shown in the charts on the following pages. The smallest wage differentials exist in the petroleum, paper and wood products sectors. It would be tempting to generalize by observing that these sectors are built more or less directly on raw materials available in Canada, but the "early stage of production" does not seem to provide a sound basis for identifying areas of probable approach to parity. In particular, the leather industry and the food and beverage industries are built quite directly on primary goods produced in Canada, and yet the U.S.-Canadian wage disparities in these sectors are among the largest.

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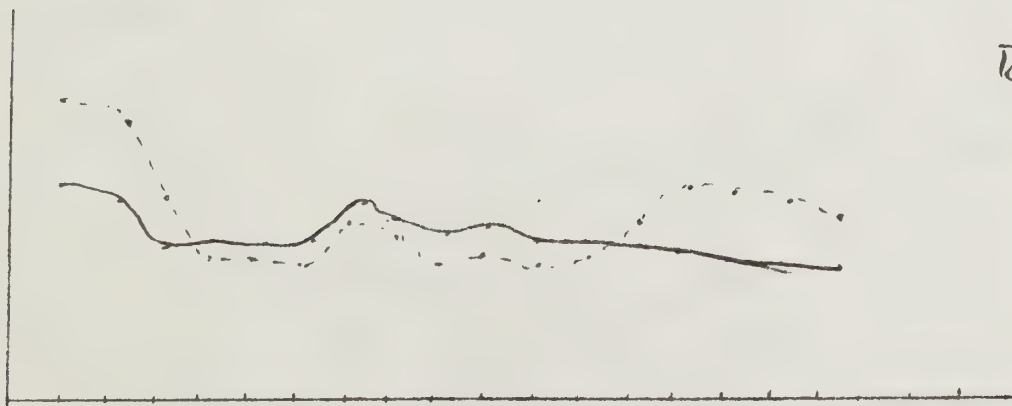
<sup>1</sup>For evidence on how industry mix affects wage averages, see our Free Trade . . . . ., pp. 43-54.



Food +  
Beverages



Tobacco



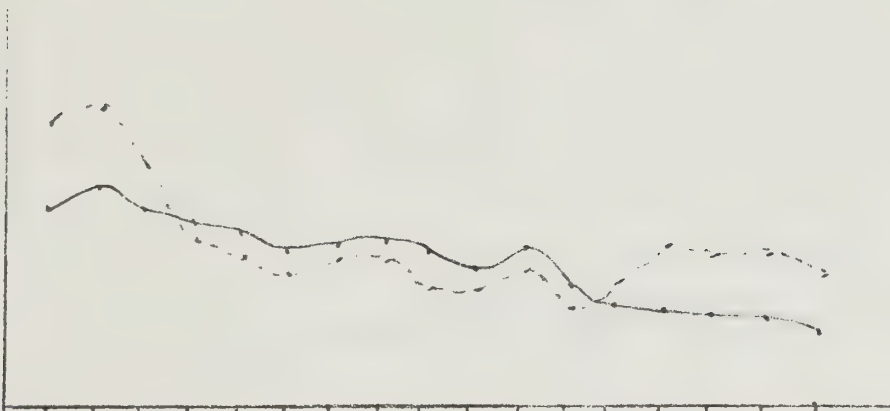
Rubber



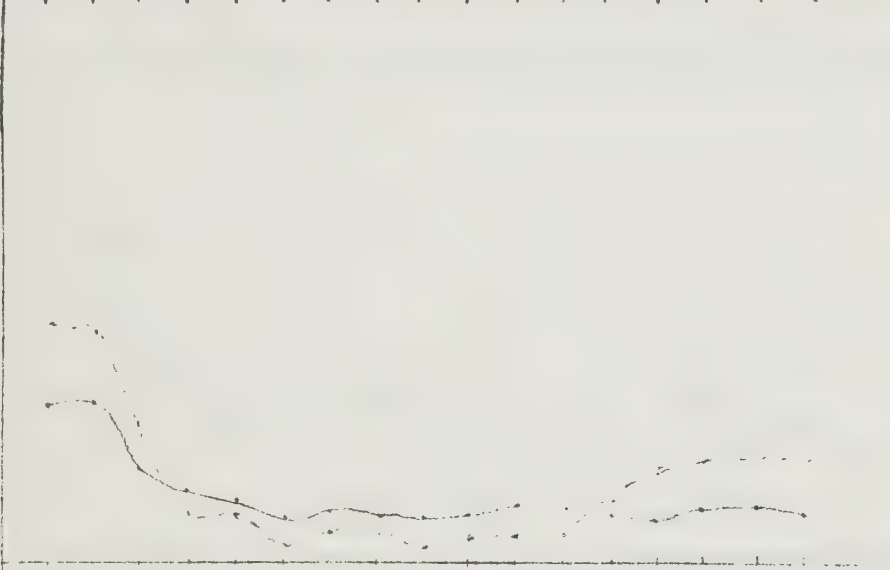
Leather

Textiles

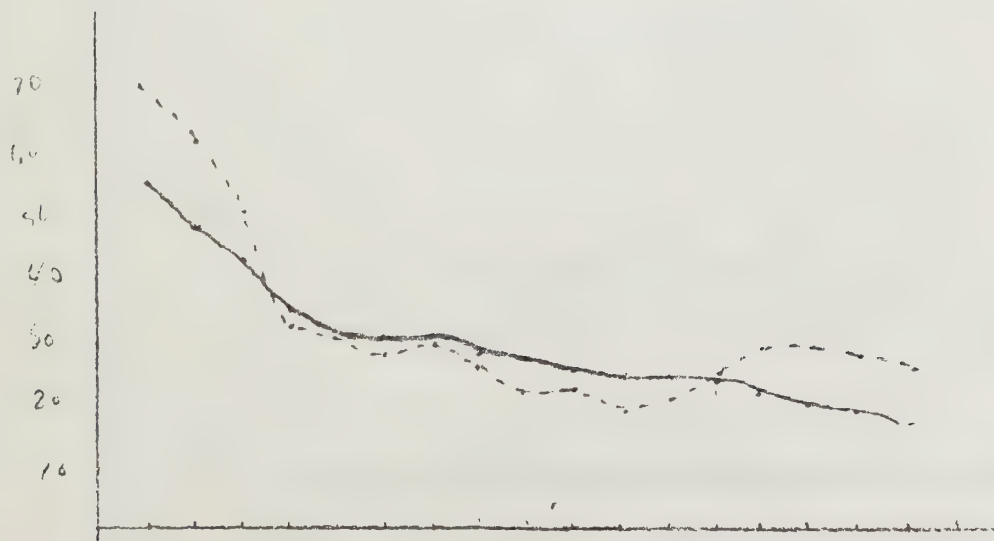
Clothing



Wood



Paper



Printing

Acetic Acid

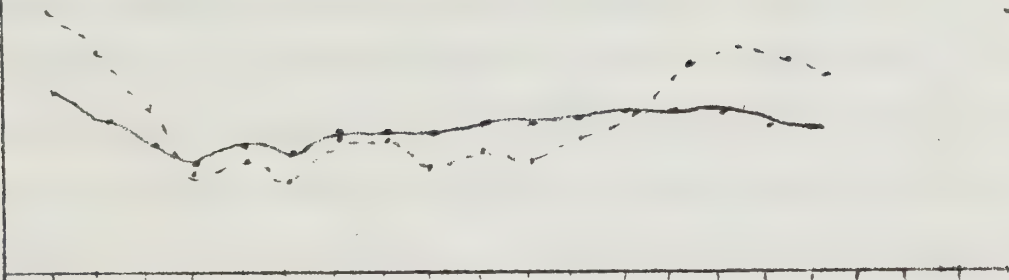
100.0000

Acetic Acid

100.0000

Chemical

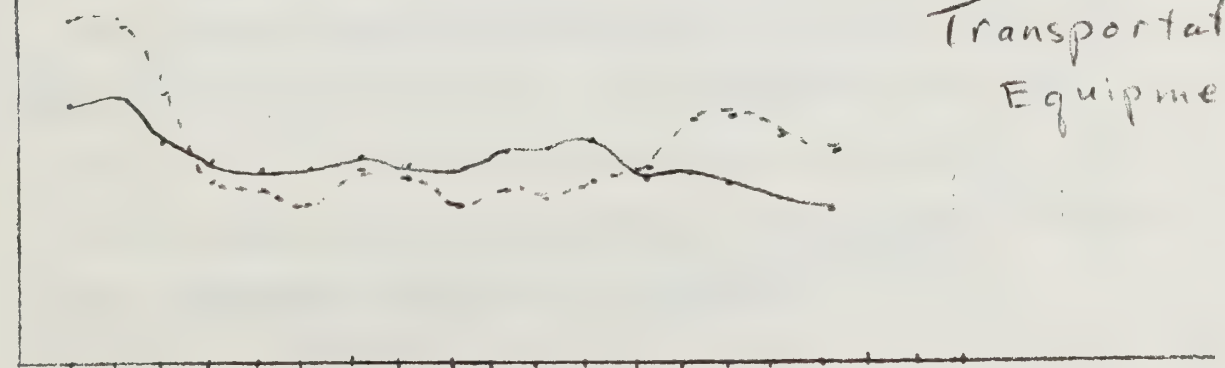
Electrical  
Supplies



Non metallic  
minerals



Transportation  
Equipment





Non ferrous  
Metals



Construction



Mining.



### CHAPTER III

#### THE POTENTIAL PRICE IMPLICATIONS OF WAGE PARITY, BY INDUSTRIAL SECTOR<sup>\*</sup>

In the first chapter, it was noted that wage parity raises two broad types of issues, one associated with the allocation of resources, and one associated with the general economic question of inflation and, in particular, with the problems which arise when the objectives of full employment and of relatively stable prices give conflicting signals regarding desirable monetary and fiscal policies. Both broad issues involve complex questions of theory and fact. In the first chapter, we dealt with the theoretical aspects of the allocation and inflation problems and, in particular, the difficulties inherent in any government "rule of thumb" to be used as a point of reference in negotiations.

In this chapter we will provide some data on the potential upward pressures on prices which might be associated with a move towards parity. It must be stressed that if one looks at the inflationary possibilities of wage changes, one should also look at the possibilities of inflation associated with changes in profits or other (money) incomes as well. In confining ourselves to the subject of wage changes, therefore, we are taking a very partial view of the whole price problem.

One other major qualification should also be stressed. Where wage increases - whether to parity or not - are accompanied by equivalent

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<sup>\*</sup>We are greatly indebted to Karen Sharp for her assistance in the calculations, programming, and drafting of this chapter.

productivity increases,<sup>1</sup> no pressures for price increases need arise. Because the strength of union demands for parity - and the willingness of employers to grant parity - is closely associated with productivity, it is possible that much of any possible future movement to parity will have relatively little tendency to push up prices (relative to the U. S.). Any prediction of the actual price strains which will in fact be associated with parity must involve a judgment on the probable degree of parity which will be achieved without there being equivalent productivity changes. This clearly involves matters - both technological issues affecting productivity and bargaining strategies of labour and management - which lie outside the scope of this study.

Rather than become involved in these complex matters, what we propose to do is to put the wage-price implications of parity in their simplest - and starkest - form. Specifically, we will consider the implications of an elimination of the U. S.-Canadian wage differential which is unaccompanied by any change in relative productivity between the two countries. Because of the aforementioned tendency of both labour and management to appeal to productivity matters in collective bargaining, it is thus to be expected that the discussion below overstates - and quite possibly greatly misstates - the problems which will actually be faced in future movements to parity. Put another way, the reader may wish to discount the figures given below to the extent that he anticipates a closing of the U. S.-Canadian productivity gap.

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<sup>1</sup>Measured in the relevant sense. That is, the pitfalls in evaluating productivity, noted in Chapter I, are skipped over here.

A. Potential First Round Effects of Wage Parity in a Single Industry

Where Canadian wages rise relative to U. S. wages in a single industry without any corresponding closing of the productivity differential, the increased wage must somehow be shifted. It may be shifted forward, in the form of higher product prices, or it may be shifted to the suppliers of other contributors to the productive process, such as capital or material inputs. In the statistical sections below, the magnitudes involved in such shifts are studied. In fact, of course, the higher wage will not be shifted in only one of these directions; instead the effects would be divided in some proportion between higher output prices, lower rents and profits, and lower returns to other inputs. In such a case, changes would be less than shown below, since each of the following estimates is a maximum based on the assumption that the variable under consideration bears the whole burden of the wage increase.

1. Assuming that total wage increase is shifted forward in the form of higher prices.

Suppose that the Canadian wage increase necessary to close the U. S.-Canadian wage gap in a single industry is passed along in the form of higher prices. (The questions which arise when parity is gained in many industries simultaneously are considered in Section B.) This may or may not in fact be possible, depending on the competitive pressures on the industry in question; this, of course, explains the view of many employers on wage parity - it is seen as a threat to their competitive position. The extent of potential price increase will depend on the extent of the wage increase, and the importance of labour as an input. If, for example, labour



represented twenty per cent of the cost of a product, and a thirty per cent increase in the Canadian wage is necessary to close the wage gap, then a complete forward shifting of an increase to parity would involve a six per cent price increase. Such calculations for sixteen industrial categories are shown in column 10 of Table I. The data are presented on two bases: first, assuming that workers achieve "nominal parity" in their negotiations, and second, assuming that they achieve parity wages adjusted for the exchange rate. Because of the discount on the Canadian dollar, the second of these figures is greater than the first; in the case of food and beverages, for example, the increase in Canadian wages required to achieve nominal parity would, if shifted forward in the form of higher prices, result in a 2.8 per cent price increase; exchange-adjusted parity would result in a 3.6 per cent increase.

Two industrial groups - tobacco and petroleum - show a much smaller potential price effect of parity than do other industries. The small figures for petroleum are the combined result of relatively small wage differentials, and of a low ratio of labour costs to final price. Tobacco is different from all other broad industrial categories in that wages, even after exchange adjustment, do not greatly differ between the U. S. and Canada. This may be attributed to the regional location of the tobacco industry: in the U. S. it is located in the South where wages are generally at the bottom of the U. S. scale; in Canada, the tobacco industry is concentrated in Ontario, a high-wage region. The exchange-adjusted U. S.-Canadian wage differential of 1¢ is trivial; if it were eliminated, the resulting price increase in Canada would be less than 1/20 of 1 per cent

TABLE I

Costs, Comparative Wages, and Possible Initial Implications of Wage Parity in Each of the Following Industries  
(Assuming no closing of productivity gaps 1964 data)

(1) Industry	(2) Value of Output, 1964 (\$000,000)	(3) Proportion of Value Allocated to:		(5) Hourly Wage in: Canada (1964)	(6) U.S.* (1964)	(7) Proportionate Increase in Canadian Wages Implied by Nominal and Exchange-Adjusted Parity	(8) Alternative Possible Effects of Parity		(10) % Increase in Selling Price
		(1) Materials	(2) Labour				A % Decrease in Other Returns	B % Decrease in Material Input Prices	
		$E_{1j}$	$q_j$	$v_j$	\$ Can. \$ U.S.	(100) $\Delta w_j$	(100) $\Delta r_j$	100 $(\Delta p_j)$	100 $(\Delta p_j)$
Food & Beverages	6137.8	.665	.079	.256	1.76	2.37 2.56	10.8% 14.1	4.12 5.4	2.8% 3.6
Tobacco Products	356.1	.619	.096	.285	2.11	1.96 2.12	.1	.1	.0
Rubber	433.7	.496	.183	.321	2.08	2.54 2.75	12.6 18.3	8.2 11.8	4.1 5.9
Leather	331.7	.506	.248	.246	1.39	1.82 1.97	31.1 41.8	15.1 7.4	7.7 10.3
Textiles	1506.1	.559	.170	.271	1.55	1.79 1.94	15.5 24.9	4.7 7.6	2.6 4.2
Clothing	1004.0	.538	.223	.239	1.34	1.79 1.94	31.4 41.6	14.0 18.5	7.5 9.9
Wood	1894.9	.547	.213	.240	1.86	2.09 2.26	10.9 19.0	4.8 8.4	2.6 4.6
Paper	2715.9	.523	.154	.323	2.36	2.56 2.77	4.0 8.3	2.5 5.1	1.3 2.7
Printing	987.8	.327	.215	.458	2.49	2.97 3.21	9.1 13.6	12.7 19.1	4.2 6.2
Metals	5796.6	.529	.178	.293	2.32	2.89 3.12	14.9 21.0	8.3 11.7	4.4 6.2
Transport	895.5	.503	.225	.272	2.42	2.96 3.20	18.5 26.7	10.0 14.4	5.0 7.3
Auto	2348.0	.671	.120	.209	2.54	3.21 3.47	15.1 21.0	4.7 6.6	3.2 4.4
Electrical Instruments	1723.4	.491	.161	.346	2.03	2.51 2.71	11.0 15.6	7.7 11.0	3.8 5.4
Non metal minerals	919.0	.442	.179	.379	2.07	2.53 2.74	10.5 15.1	9.0 13.0	4.0 5.7
Petroleum	1413.4	.797	.032	.171	2.85	3.20 3.46	2.3 4.0	.5 .9	.4 .7
Chemicals	1413.4	.476	.089	.431	2.25	2.80 3.03	5.0 7.0	4.6 6.5	2.2 3.1
Average, all manufacturing						.251 .353			

D. B. S., Manufacturing Industries of Canada.

D.B.S., Hours and Hourly Earnings.

U.S. Bureau of Labor Statistics, Employment and Earnings.

Statistics for the United States, 1964-1965.

\* The first figure is the U.S. wage expressed in U.S. dollars, while the figure below is the U.S. wage expressed in Canadian dollars. Hence the first set of calculations in the last three columns represents possible effects of nominal parity, while the set below represent the effects of exchange adjusted parity.

(col. 10). A movement to nominal parity would involve a reduction, not an increase in Canadian tobacco wages. Since this violates the spirit of this study, no calculations are shown for nominal parity in tobacco.

In the sections below, more complex possible effects of wage changes are shown. Their exposition is greatly facilitated by formalized statement, and we therefore provide the basis for the later exposition with a formalization of the direct price changes discussed above.

Price and cost of industry  $j$  may be broken down in the following way:

$$P_j = \sum a_{ij} P_i + q_j w_j + v_j r_j \quad (1)$$

where  $P_j$  is the price of product  $j$ ,  $w_j$  its wage rate, and  $r_j$  the return to other primary inputs in this industry. Since we are interested in changes in these prices, rather than their absolute value, we set them all equal to 1 for the base year. Thus,  $a_{ij}$ ,  $q_j$  and  $v_j$  become proportionate amounts of product  $i$ , labour, and other inputs <sup>the costs</sup> in industry  $j$ ; moreover, we may interpret these as physical input requirements--with a physical unit being defined as "one dollar's worth" of the input at base year prices. In this analysis we assume away substitution between inputs; thus,  $a_{ij}$ ,  $q_j$  and  $v_j$  are regarded as given constants. (1) then becomes an equation in which the only variables are the prices  $P_j$ ,  $P_i$ ,  $w_j$  and  $r_j$ . Moreover, because of its linearity, (1) may be rewritten:

$$\Delta P_j = \sum a_{ij} \Delta P_i + q_j \Delta w_j + v_j \Delta r_j \quad (2)$$

where  $\Delta$  signifies "change in" that variable. The analysis of this

chapter is simply a set of variations of this equation, which can be used to examine the effects of the change in labour costs,  $(\Delta w_j)$  implied by wage parity. In this section we have already set out the possible effects of wage parity on final prices. In this case, we assumed that the price of primary factors other than labour, and all materials inputs remain constant, i.e., for any specific industry  $j$  :

$$\Delta r_j = \Delta P_i = 0 \quad (3)$$

(2) then became

$$\Delta P_j = q_j \Delta w_j \quad (4)$$

For each industry  $j$ , the two wage changes implied by apparent and real parity are substituted into (4), yielding two solutions for the degree that the price of  $j$  would have to be increased to fully compensate for higher wage costs; these figures have already been examined in column (10) of Table I. The conclusion is that wage changes ranging up to 45 per cent would affect product prices by 10 per cent or less. At the one extreme, we have already noted that price in Petroleum, an industry using little labour, would be affected by only a fraction of 1 per cent; at the other extreme, price in the labour-intensive leather industry could be affected by as much as 10 per cent.

The figures in column (10) cannot be read en bloc, but must be interpreted one at a time. We cannot yet consider the effects of wage parity in all industries, since in this case all prices would be revised upwards, violating the basic assumption (3), [that  $\Delta P_i = 0$ ].



Since these calculations are based on the assumption that the incidence of higher wages falls entirely on output price, they may be interpreted as maximum estimates. There are two exceptions to this generalization. First, the achievement of parity in one industry may increase pressures for parity in others. If it does, it is relevant to consider the effects of parity in several, many, or all industries at once; this problem is studied in Section B. For the time being, it suffices to note that the price implications of parity in many industries will be greater than that in just one or a few industries.

Second, we have assumed that the return to other factors remains constant; but in fact, the return to capital might increase. Where general market imperfections or political pressures (such as those represented by government guidelines) have resulted in sticky prices, a wage increase may be taken as the occasion for raising prices by more than enough to cover the wage increase; that is, wage increases may provide an opportunity to get around the profit restraints provided by market imperfection or by political pressures, and raise profits as well. In addition, it may be argued that competitive economic forces might result in an increase in returns to capital per unit of output. Where wages rise (in the absence of equivalent productivity increases), the costs of production rise, and therefore the amount of capital needed to finance a given quantity of inventories will rise. Where inventories are financed by borrowing, total interest charges will rise; where they are financed by equity, the increased volume of funds needed to finance the inventories may have to be attracted by higher returns to equity. Put slightly differently, it may be more

sensible to look on capital returns (interest and profits) as constituting a fraction of the selling price rather than an absolute number of dollars per unit of output. If profits remain constant, not in absolute dollar terms per unit of output, but as a fraction of the selling price,<sup>1</sup> then the estimates in column (10) of Table I are understatements.

2. Assuming total wage increase is shifted back onto input suppliers.

Another possibility is that a parity wage might be shifted backward onto other inputs in the productive process. In this case the selling price of the final product, and the returns to all primary factors other than labour are assumed constant; i.e., for any specific industry  $j$  :

$$\Delta P_j = \Delta r_j = 0 \quad (6)$$

Thus (2) becomes

$$-\sum a_{ij} \Delta P_i = q_j \Delta w_j \quad (7)$$

This single equation cannot be solved for the whole set of input prices ( $P_i$ ) unless we assume, for example, that all inputs bear the burden equally (i.e., that there is only one, average  $\Delta P_i$ ). In this case (7) can be solved, with the average change in input prices being:

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<sup>1</sup>Equation (4) would then be modified to

$$\Delta P_j = \frac{q_j \Delta w_j}{1 - v_j} \quad (5)$$

Such a calculation has not be included in Table I.

$$\Delta P_i = \frac{-q_i \Delta w_i}{\sum a_{ij}} \quad (8)$$

the negative sign signifying a decrease. Two alternative  $\Delta w_j$ 's substituted into (7) yield two proportionate input price reductions (one based on nominal parity, the other on adjusted parity). These are expressed in percentage form, and set out in column (9) of Table I.

Once again the estimates in column (9) must be interpreted one-at-a-time. One cannot view these estimates en bloc as a picture of the effects of parity in all industries at once. The reason is that the output of one industry is the input of another. Thus the effects on the 'other' prices in the system can be isolated only if a single industry is considered.

In examining the specific elements in column (9), we note that in the first industry - food and beverages - labour contributes 7.9 per cent of cost while material inputs contribute 66.5 per cent. The 34.7 per cent Canadian wage increase required to achieve nominal parity would, if shifted exclusively back to material inputs, involve a reduction in their price by 4.1 per cent (i.e., from (8),  $P_i = \frac{-.079(.347)}{.665} = -4.1\%$ ). The greatest pressure would fall on suppliers to the clothing industry (because of its large wage increase implied by parity) and printing (because the incidence would fall heavily on the relatively limited materials required by this industry).

The greater is the fraction of total costs over which the wage increase can be spread, the smaller will be the percentage decrease in input prices in the event of a backward shifting of wage increases. Thus, while the

estimates in column (9) are in a sense maxima - the actual input price changes would be lower if part of the wage increase fell elsewhere - they may be exceeded for individual inputs if all inputs do not share the burden equally. If, for example, the prices of half the inputs were immune to backward shifting - as might be the case if inputs were imported, with their prices being established in international markets - then, if the total burden fell on the remaining half of the inputs, their prices would fall by twice as much as the percentages shown in column (9). From the viewpoint of an individual supplier, therefore, there is no assurance that the data in column (9) will represent the limit of the pressures to which he might be subjected. The more specific to the industry the item he supplies, the greater is his potential problem.

### 3. Assuming Wage Increases borne only by other primary factors.

The final possibility is that wage increases fall entirely on primary inputs excluding labour; in this case, the prices of all other inputs and the product price remain constant, i.e.:

$$\Delta P_j = \Delta P_i = 0, \text{ for all } i \quad (9)$$

Thus (2) becomes an equation relating the change in these factor returns to the wage change:

$$\Delta r_j = \frac{-q_i \Delta w_i}{v_j} \quad (10)$$

with the negative sign signifying that if wages increase, a decrease in other primary returns is implied. For each industry, the two alternative parity wage increases in column (7) are substituted into (10), providing a



solution in each case for  $\Delta r_j$ , the proportionate decrease in returns to other primary factors (e.g., capital, land, etc.). These figures, re-expressed as percentages, are shown in column (8) of Table I. In some industries (leather, clothing) the picture is one of very substantial pressure on these returns both because of the size of the wage revision involved in reaching parity, and also because of the large impact of any wage change on the costs of these labour-intensive industries. At the other extreme, in the petroleum industry (with its very limited labour requirements) total costs and hence returns to other primary factors would be much less affected.

One of the important factor returns described by these calculations is profits, and the effect of wage parity on profits may be understated in this table. If producers have capital leverage provided by borrowings with fixed interest payments, they will be unable to shift any of the burden on the interest segment of capital, and the impact on profits will be even greater than shown in column (8).

Rent is another factor payment that should be considered in detail along with profits, since it is often assumed that these would be the first to be squeezed by wage parity. In the case of economic rents,<sup>1</sup> there is a likelihood that these payments, being a residual, would not only be held

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<sup>1</sup>Economic rents are "payments to any factors in fixed supply above that necessary to keep them in their present occupation." This differs, of course, from the business definition of rent as a payment made for the services of housing, machinery, etc.

down, but even reduced or eliminated by wage parity. Profits also appear to be vulnerable. However, to the degree that profit is a return necessary to keep capital in its present occupation, wage parity cannot be gained at the expense of profits.

This highlights the fact that the price changes we have calculated above, (and in Section B below) simply cannot be realized. Hence we view these calculations as price "pressures", rather than actual changes; pressures, which will give rise to broader general equilibrium adjustments, described in Chapter 4.

B. Potential General Equilibrium Effects of Wage Parity in a Single Industry, and in all Industries.

Although the data presented above gives an indication of the possible direct effects of wage parity (subject to a number of specific assumptions), they do not present an adequate view of the potential effects of changes which work themselves through the economy. Specifically, the output of one industry frequently provides the input of another, so that an increase in the price of the first industry's output will, if passed along, also cause an upward movement in the price of other industries.

Such indirect effects may be estimated with the use of an input-output system, the details of which are given in the formalized statement below. Unfortunately, up-to-date input-output data are not available; the most recent table available for 1959 was used in the derivation of

Tables 2-5.<sup>1</sup> Tables 2 and 3 show the total effects if wage parity is achieved in single industries; that is, it shows the effect of a wage increase in a single industry which is passed along in the form of higher prices, which are in turn passed along by user industries in the form of higher prices for their outputs; and so on. Tables 2 and 3 thus pick up indirect effects; but, other than this major change, the assumptions on which they are based are similar to the assumptions behind the price column (i.e., column 10) of Table I. That is, it is assumed that the elimination of the U. S.-Canadian wage differential is unaccompanied by any closing of the productivity gap; to the extent that such a productivity change occurs, figures of Tables 2 and 3 would have to be scaled down. Secondly, it is assumed that the (absolute) returns to capital remain unchanged. As noted in Section A above, there might in practice be deviations from this assumption in either direction - capital returns might be depressed by the rise in wages, in which case the estimates of Tables 2 and 3 would have to be lowered; alternatively, absolute capital returns might increase (as would be the case if percentage profit margins were maintained, for example), in which case the estimates of Tables 2 and 3 would be too low.

Table 2 shows the effects of exchange-adjusted parity, and Table 3 of nominal parity. Thus, for example, if exchange-adjusted parity is

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<sup>1</sup>We are indebted to Professor John Sawyer for making available a revised input-out table for 1959; see "Import and Employment Content of the Components of Gross National Expenditure" Working Paper 1968, Institute for the Quantitative Analysis of Social and Economic Policy, University of Toronto, 1967.

TABLE 2. ~~Adjusted~~  
~~Exchange Rate~~

Price Increase in Each Industry Resulting from ~~Actual~~ Wage Parity in Any Industry 1959 for 28 industries

$E = [I - A]^{-1} QAW$

When Adjusted Parity  
Wage Achieved Here  
Prices Rise Here ↓

	1. Agriculture	2. Forestry	3. Fishing, hunting, trapping	4. Metal mining	5. Coal mining	6. Non-metal mining	7. Food, Bev.
1. Agriculture	1.00000	0.05502	0.00079	0.02045	0.35235	0.02210	0.04510
2. Forestry	0.02057	15.76117	0.00000	0.02645	0.22845	0.00714	0.00745
3. Fishing, hunting, trapping	0.00012	0.02045	5.50344	0.02101	0.27628	0.00000	0.00261
4. Metal mining	0.00067	0.04882	0.00011	1.14422	0.17187	0.05871	0.01012
5. Coal mining	0.00134	0.01422	0.00004	0.01383	15.25456	0.00566	0.00550
6. Non-metal mining	0.00259	0.08898	0.00006	0.07814	0.23075	0.41251	0.00515
7. Food, beverages	0.00001	0.12116	0.07866	0.02754	0.21681	0.02377	7.23734
8. Tobacco and tobacco products	0.00776	0.20986	0.00244	0.02113	0.20585	0.01006	0.22716
9. Rubber products	0.00944	0.05807	0.00031	0.03207	0.14246	0.02960	0.02446
10. Leather products	0.00998	0.11070	0.00431	0.02521	0.09364	0.01255	0.04084
11. Textile products (except clothing)	0.01352	0.06615	0.00020	0.01650	0.07500	0.01351	0.02690
12. Clothing (textile and fur)	0.01150	0.05259	0.02340	0.01310	0.05150	0.00925	0.01289
13. Wood products (including furniture)	0.00056	5.52775	0.00020	0.03368	0.15522	0.01157	0.01607
14. Paper products	0.00400	5.22186	0.00025	0.03355	0.22656	0.10207	0.02105
15. Printing, publishing, and allied industries	0.01040	0.09356	0.00016	0.01478	0.12270	0.02332	0.01278
16. Metal products	0.00214	0.05062	0.00007	0.04245	0.27005	0.03453	0.00400
17. Transportation equipment	0.00201	0.05055	0.00013	0.10725	0.15255	0.02845	0.00677
18. Electrical apparatus and supplies	0.00342	0.09356	0.00010	0.22079	0.10515	0.02175	0.00766
19. Non-metallic mineral products	0.00751	0.11045	0.00019	0.05375	0.36022	0.00820	0.01335
20. Products of petroleum and coal	0.00171	0.05010	0.00006	0.01451	4.52214	0.01306	0.00457
21. Chemicals and allied products	0.00690	0.15376	0.00250	0.11560	0.30191	0.14576	0.21613
22. Miscellaneous manufacturing	0.00005	0.11216	0.00010	0.58207	0.14715	0.01500	0.01561
23. Construction	0.01010	0.54788	0.00020	0.09757	0.19215	0.21755	0.01670
24. Transportation, storage, trade	0.00510	0.07784	0.00010	0.01629	0.15656	0.01337	0.00005
25. Communication	0.00177	0.05149	0.00009	0.01770	0.12547	0.01164	0.00559
26. Electric power gas and water utilities	0.00415	0.07156	0.00010	0.00005	0.46007	0.01600	0.00112
27. Finance, insurance, real estate	0.00272	0.00016	0.00010	0.01269	0.00701	0.02076	0.00325
28. Service industries	0.01300	0.10067	0.00170	0.02145	0.00105	0.01112	0.00570





28. Service Industries	0.0935	0.25426	0.01662	0.43441	0.61426	0.05752	0.06918	0.18195	0.11038
27. Finance Insurance Real Estate	0.06909	0.02114	0.00802	0.25754	0.29297	0.02223	0.02373	0.05553	0.04030
26. Electric Power, gas Water utilities	0.08356	0.05987	0.41255	0.08351	0.37674	0.03708	0.05261	0.07485	0.05694
25. Communication	0.03779	0.30209	0.01955	0.26020	0.43497	0.07538	0.49678	0.07544	0.17588
24. Transportation Storage, Trade	0.02978	0.09075	0.00990	0.27752	0.22950	0.04621	0.25497	0.06212	0.00989
23. Construction	0.05391	0.12677	0.01917	0.54353	0.51966	0.10493	0.17701	0.00130	0.15557
22. Misc, manufacturing	0.05988	0.22976	0.04279	0.35085	1.30192	0.19251	0.10393	0.15112	0.55359
21. Chemicals allied prod.	0.05837	0.19295	0.03542	0.34925	0.86538	0.09446	0.09026	0.19115	0.75222
20. Petroleum & coal prod.	0.05391	0.08210	0.05554	0.25862	0.57620	0.32443	0.12535	0.22790	0.41247
	0.02509	0.09617	0.03553	0.22574	0.84000	0.28622	0.08434	0.12643	0.25797
	0.01647	0.49207	0.02229	0.20762	0.45567	0.13354	0.12055	0.09534	0.13886
	0.01183	0.17381	0.16409	0.16670	0.41120	0.27270	0.07709	0.09552	0.15866
	0.04518	0.14517	0.05015	0.29239	0.88054	0.22942	0.09527	0.10894	0.20550
	0.05453	0.20249	0.02735	0.32585	0.67653	0.24047	0.28490	0.11648	0.21259
	0.03102	0.26118	0.05372	0.24950	0.55429	0.45686	0.13628	0.18453	0.52172
	0.07557	0.09090	0.02354	0.52190	0.73433	0.18322	0.21595	0.12463	0.25699
	0.03647	0.15361	0.12522	0.20500	0.57777	0.13899	0.00851	0.00105	0.19237
	0.02818	0.18117	0.05503	0.20145	0.57272	0.23243	0.17289	0.11083	0.27942
	0.08610	0.16723	0.03644	0.29198	0.79173	0.12529	0.26897	0.15250	0.21353
	1.32703	0.08947	0.02829	0.50659	0.78262	0.12372	0.16719	0.17347	0.21233
	0.08437	7.74344	0.04173	0.52554	0.86328	0.26280	0.21688	0.17259	0.48581
	0.04983	0.25483	0.16839	0.22503	0.53229	0.35720	0.09052	0.17225	0.37131
	0.04995	0.40238	0.08023	0.45973	1.46966	0.17449	0.13851	0.15265	0.53915
	0.03146	0.05661	0.11363	0.83754	6.98054	0.17755	0.08797	0.18758	0.44712
	0.03486	0.04723	0.10667	0.69324	0.69943	0.27544	0.07615	0.12189	0.40383
	0.05582	0.26301	0.02211	0.35659	0.41889	0.02211	0.74729	0.09682	0.14911
	0.01759	0.05349	0.02946	1.64693	0.27222	0.17863	0.10179	5.02045	0.51819
	0.02141	0.14612	0.23333	0.43566	0.41745	0.27835	0.29747	0.11684	0.23533

TABLE 3

Price Increase in Each Industry Resulting from Nominal Wage Index in A. Industry

$$E = [I - A'] \cdot Q \Delta W$$

New Nominal Wage

Parity Achieved Here

Prices

Rise Here

1 Agriculture

2 Forestry

3 Fishing, hunting, trapping

4 Metal mining, smelting, refining

5 Coal mining, crude petroleum, natural gas

6 Non-metal mining quarrying, prospecting

7 Food and beverage

8 Tobacco & tobacco products

1 Agriculture

2 Forestry

3 Fishing, hunting, trapping

4 Metal mining, smelting, refining

5 Coal mining, crude petroleum, natural gas

6 Non-metal mining, quarrying, prospecting

7 Food and beverage

8 Tobacco and tobacco products

9 Rubber products

10 Leather products

11 Textile products (except clothing)

12 Clothing (textile and fur)

13 Wood products

14 Paper products

15 Printing, publishing, allied industries

16 Metal products

17 Transportation equipment

18 Electrical apparatus & supplies

19 Non-metallic mineral products

20 Products of petroleum & coal

21 Chemicals & allied products

22 Miscellaneous manufacturing

23 Construction

24 Transportation, storage, trade

25 Communication

26 Electric power, gas, & water utilities

27 Insurance, real estate

28 Service industries

1.402586	0.024570	0.056737	0.014469	0.257448	0.014545	0.491169	0.000000
0.014432	1.055692	0.000053	0.018717	0.175982	0.004510	0.005655	0.000000
0.000871	0.020680	0.864609	0.015502	0.214027	0.005161	0.001092	0.000000
0.003277	0.034109	0.000000	0.000000	0.133167	0.000000	0.000000	0.000000
0.000941	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001823	0.062415	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.406848	0.084990	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.475429	0.147070	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.006625	0.040737	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.063107	0.077657	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.009488	0.046387	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.007929	0.036754	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.023402	0.334274	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.024460	0.259973	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.007299	0.490573	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001502	0.035509	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001975	0.039237	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.002404	0.065491	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.005269	0.077466	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001205	0.021183	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.002365	0.095236	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.004231	0.078691	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.007088	0.243826	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.002175	0.054043	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001244	0.036124	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.002917	0.050072	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.001911	0.041590	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.009545	0.070760	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000







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26 Service industries

27. Finance, insurance,  
Real estate

26. Electric power, gas  
& water utilities

25. Communication

24. Transportation,  
storage & trade

23. Construction

22. Misc. manufacturing

21. Chemicals & allied  
products

20. Products of petrol-  
eum & coal

19. Non-metallic  
mineral products

1.	0.021913	0.0356416	0.179012	0.012518	0.355686	0.273757	0.039438	0.042855	0.124074	0.065539
2.	0.007841	0.039236	0.014064	0.005806	0.194333	0.132547	0.015356	0.016900	0.022870	0.023963
3.	0.003069	0.047337	0.0642369	0.298312	0.068463	0.170966	0.025547	0.023226	0.051050	0.034700
4.	0.004937	0.021459	0.213760	0.013097	0.213045	0.197394	0.052613	0.353737	0.050091	0.102000
5.	0.000517	0.016013	0.0664202	0.027162	0.227228	0.194151	0.031012	0.191554	0.042360	0.058000
6.	0.014714	0.033615	0.089705	0.013864	0.286021	0.235825	0.072280	0.126046	0.062261	0.090000
7.	0.007162	0.034033	0.162579	0.030045	0.287269	0.500816	0.100510	0.073986	0.193048	0.104000
8.	0.017100	0.033487	0.136520	0.024169	0.278575	0.392713	0.000073	0.064272	0.130447	0.044000
9.	0.017302	0.022667	0.482651	0.025704	0.193736	0.261485	0.223479	0.087624	0.155408	0.243430
10.	0.024217	0.014249	0.068054	0.025672	0.185648	0.331195	0.197159	0.000061	0.086218	0.151000
11.	0.017093	0.020354	0.243125	0.016119	0.160908	0.206787	0.096125	0.095828	0.063651	0.031000
12.	0.000743	0.005749	0.138556	0.104191	0.136493	0.185605	0.187850	0.054829	0.065130	0.061000
13.	0.012613	0.024522	0.101306	0.021308	0.239401	0.395592	0.159038	0.056415	0.074200	0.121000
14.	0.000835	0.031043	0.143283	0.019783	0.266797	0.307015	0.165868	0.202230	0.079433	0.120000
15.	0.016824	0.017618	0.184808	0.024385	0.204193	0.251530	0.314704	0.097043	0.125933	0.180000
16.	0.034633	0.042915	0.064324	0.019050	0.263561	0.333264	0.126212	0.153769	0.084986	0.151000
17.	0.073678	0.020712	0.110922	0.020552	0.167947	0.262197	0.095743	0.070145	0.052002	0.113000
18.	0.053755	0.015002	0.123109	0.026355	0.239070	0.359202	0.086309	0.072084	0.075581	0.150000
19.	0.019435	0.048892	0.118333	0.020397	0.251037	0.355105	0.098670	0.110952	0.118092	0.120000
20.	0.011300	0.0787596	0.063311	0.030214	0.264916	0.391761	0.181028	0.154437	0.117693	0.280000
21.	0.011080	0.048195	5.479145	0.030214	0.264916	0.391761	0.181028	0.154437	0.117693	0.280000
22.	0.017655	0.023104	0.180175	0.037438	0.184253	0.255132	0.246154	0.064457	0.117463	0.210000
23.	0.015713	0.028366	0.284933	0.058041	0.992003	0.666940	0.120106	0.005779	0.104210	0.231000
24.	0.033776	0.017864	0.040058	0.082166	0.570964	3.167794	0.122303	0.062644	0.114274	0.260000
25.	0.002570	0.019799	0.033421	0.077135	0.543043	0.317405	1.898515	0.052802	0.083060	0.291500
26.	0.033427	0.031247	0.200257	0.023803	0.768250	0.100005	0.043169	4.894415	0.03158	0.073000
27.	0.041004	0.009991	0.037790	0.021305	1.513836	0.123539	0.123186	0.072622	3.423414	0.302310
28.	0.015947	0.012162	0.103397	0.168942	0.332144	0.189444	0.101746	3.147737	0.079670	6.057000

achieved in textiles (column 11, Table 2), then the price of clothing (row 12) will increase by about 2.9 per cent. We note that this is an exceptionally large off-diagonal element. In general such price increases induced by parity in another industry are less than 1 per cent. Large figures of course occur in the diagonal elements, reflecting the large price increase in any industry in which parity wages occur.

It has already been noted that exchange-adjusted parity in the tobacco industry would not mean large wage changes. But the tobacco industry is unique in another way: its wage change affects only its own price. When we examine this column (No. 8), we note that all elements (except the diagonal) are zero. Since no other industry used tobacco products as an input, a tobacco price increase ends there. On the other hand, the transportation, storage, and trade industry (No. 24) is an important supplier to almost every other industry. Although the initial price change required by this industry to finance exchange adjusted parity is not large (7.0 per cent), a substantial part of this is transferred to almost all other industries; the average off-diagonal price increase in this column is about 0.6 per cent.

Several other observations come as no surprise. Wage parity in forestry would have considerable effect on both wood products and paper products. Parity in textiles would have a substantial effect on clothing (a price effect of 1.8 per cent for nominal parity, and 2.9 per cent for exchange-adjusted parity); but the reverse is not true, with parity in the clothing industry having little effect on the textile industry (a price effect of 0.0005 per cent for nominal parity, and 0.0009 per cent for adjusted parity).

The information in Table 2 is summarized in Table 4; Table 3 is summarized in Table 5. In Table 4, the first column gives the wage increase necessary to achieve adjusted parity in each industry; in column 2 we show the initial price increase that this implies; column 3 reproduces the diagonal elements in Table 2, showing the eventual equilibrium price increase in the industry in which parity is introduced; column 4 shows row sums from Table 2, indicating the effects on each industry if all industries achieve parity.<sup>1</sup> Thus, for example, exchange-adjusted wage parity in the leather industry (No. 10) implies a wage increase of about  $41\frac{1}{2}$  per cent; this implies an initial price increase of about  $12\frac{1}{2}$  per cent; but after this increase percolates throughout the cost/price structure of all industries, its eventual equilibrium price increase would be over  $16\frac{1}{2}$  per cent; finally, if all industries achieve parity, the price increase in leather would be about  $20\frac{1}{2}$  per cent. Table 5, a similar summary of Table 3, shows the more modest potential effects of apparent wage parity. A similar analysis is given on a more disaggregative set of 42 industries in Appendix A. Table A1 shows how our 28 and 42 industry classifications compare, while Tables A2, A3, A4 and A5 correspond to Tables 2, 3, 4 and 5 above.

Before proceeding, we note that the industries included in Table 2 differ from those in Table 1. The input-output matrix, used to derive Table 2 is based on 28 industries--including the manufacturing

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<sup>1</sup>The calculations in column 3 involve solving (17) below with the diagonal element in the dummy vector  $t$  set equal to 1, and all other elements 0; the calculations in column 4 follow from setting all elements in  $t$  equal to 1.



TABLE 4

## Summary of Effects of Adjusted Parity, 28 Industry Analysis

	(1)	(2)	(3)	(4)
	$\Delta W$ (100)	Initial % Price Increase in Industry Achieving Parity $Q \triangle W$ (100)	% Equilibrium Price Increase in Single Industry Achieving Parity	% Equilibrium Price Increase if all Industries Achieve Parity
1. Agriculture	34.500007	1.697500	1.999551	5.560500
2. Forestry	34.500007	15.743250	15.731175	17.470065
3. Fishing, hunting, trapping	34.500007	5.471699	5.509445	7.374897
4. Metal mining, smelting, refining	34.500004	11.1117015	11.144222	14.171537
5. Coal mining, crude petroleum, natural gas	49.880004	15.063510	15.254535	16.107155
6. Non-metal mining, quarrying, prospecting	25.870002	9.481553	9.492511	12.017300
7. Food, beverages	45.560001	6.561136	7.207383	12.120025
8. Tobacco and tobacco products	0.420000	0.955135	0.001457	2.000000
9. Rubber products	32.650001	7.623775	7.703077	11.075183
10. Leather products	41.550005	12.659505	16.728736	20.460454
11. Textile products (except clothing)	24.850002	6.625066	8.759480	11.161811
12. Clothing (textile and fur)	46.600006	12.975456	15.185532	16.174559
13. Wood products (including furniture)	24.620002	6.502720	6.600426	15.153517
14. Paper products	16.780002	5.522121	7.494891	19.700500
15. Printing, publishing, and allied industries	29.470001	10.977575	11.880320	16.211316
16. Metal products	34.610000	9.220102	11.135585	14.754504
17. Transportation equipment	39.190002	9.562065	10.147347	14.585371
18. Electrical apparatus and supplies	34.550001	9.804645	10.459930	14.226480
19. Non-metallic mineral products	32.150004	8.141749	8.704152	15.557261
20. Products of petroleum and coal	21.010002	1.265611	1.587358	9.450250
21. Chemicals and allied products	34.540001	6.652402	7.745444	12.236812
22. Miscellaneous manufacturing	36.040001	10.511042	11.046590	14.582255
23. Construction	70.570007	19.145657	19.456755	26.466517
24. Transportation, storage, trade	15.910001	6.527675	6.930546	9.916520
25. Communication	55.640007	15.516971	17.275441	26.715582
26. Electric power gas and water utilities	55.250007	5.561525	6.747242	19.104551
27. Finance, insurance, real estate	50.870002	4.581106	5.020464	8.888517
28. Service industries	22.400001	9.891640	10.265005	15.657556



Summary of Effects of **Neutral** Parity, 23 Industry Analysis

	(1)	(2)	(3)	(4)
	% Wage Increase Implied by Parity	Initial % Price Increase in Industry Achieving Parity	% Equilibrium Price Increase in Single Industry Achieving Parity	% Equilibrium Price Increase if all Industries Achieve Parity
1 Agriculture	24.200000	1.331000	1.402586	3.833200
2 Forestry	24.200000	11.047300	11.053502	12.217972
3 Fishing, hunting, trapping	24.200000	3.838120	3.864600	5.306671
4 Metal mining, smelting, refining	24.370000	7.864100	7.883464	9.918335
5 Coal mining, crude petroleum, natural gas	33.640000	10.139136	11.252141	11.392424
6 Non-metal mining, quarrying, prospecting	16.430000	6.021595	6.028567	8.127050
7 Food and beverage	34.650000	4.351000	5.547915	8.587409
8 Tobacco and tobacco products	-0.000000	-0.000000	-0.000000	3.158719
9 Rubber products	22.710000	5.302785	5.360044	7.051853
10 Leather products	30.940000	0.411948	12.456953	14.882874
11 Textile products (except clothing)	15.480000	4.126984	5.444143	7.931629
12 Clothing (textile and fur)	35.610000	0.913324	10.075740	13.233297
13 Wood products (including furniture)	15.470000	3.969320	4.147387	8.524110
Paper products	8.920000	1.693398	1.335166	6.455173
Printing, publishing, and allied industries	19.760000	7.360600	7.066313	10.665805
16 Metal products	24.570000	6.545448	7.005320	10.255730
17 Transportation equipment	28.750000	6.882750	7.444511	10.421418
18 Electrical apparatus and supplies	24.260000	6.928556	7.391740	9.976886
19 Non-metallic mineral products	22.220000	5.630548	6.019485	9.023212
20 Products of petroleum and coal	11.930000	0.730116	0.787596	5.391896
21 Chemicals and allied products	24.440000	4.707144	5.479145	8.422096
22 Miscellaneous manufacturing	26.060000	7.455766	7.987488	10.263226
23 Construction	57.780000	15.675714	15.902203	20.399177
24 Transportation, storage, trade	7.220000	2.962366	3.167794	5.247653
25 Communication	24.550000	10.551590	11.898515	14.154604
26 Electric power, gas, and water utilities	25.100000	3.817710	4.004415	7.169000
27 Finance, insurance, real estate	21.050000	3.123820	3.423414	6.202701
28 Service industries	13.220000	5.837052	6.957068	8.369717

$$\Delta W^{(100)}$$

$$Q \triangleq W^{(100)}$$

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industries<sup>1</sup> of Table I along with resource and service sectors. It appeared wise, since this information was available, to use it. Hence this analysis included the equilibrium effects, as cost/price increases percolate not only through manufacturing, but also through the resource and service sectors. In the interests of completeness, wage increases necessary to achieve parity (as, for example, in Table 4, column 1) were also calculated for these non-manufacturing sectors. The effects shown in Table 4, column 4, are based on the assumption that parity is achieved in the resource and service sectors, as well as manufacturing; but the effects of parity confined to manufacturing could easily be calculated by summing the appropriate elements (7-21 inclusive) in each row in Table 2.<sup>2</sup>

There is another problem involved in comparing Tables 1 and 4. The initial price changes ( $\Delta P_j$ ) in Table I are, without exception, less than the price increases ( $Q\Delta W$ ) in manufacturing shown in Table 4. Table I presents figures for 1964, but because interindustry information as recent as this was not available in adequate detail, 1956-59 figures were used for Tables 4 and 5. This is the source of the discrepancy; but we are not entirely clear why the latter year (1964) should show the lower figures.

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<sup>1</sup>With one change: in Table 2 Motor Vehicles and Parts are included in the Transportation Equipment industry.

<sup>2</sup>Other variants are also possible. For example, the effect of parity in the Agriculture, Transportation, and Chemical industries (Nos. 1, 24, 21) on Food and Beverages (No. 7) is calculated by adding elements 1, 24, and 21 in the seventh row (i.e.,  $\Delta P_7 = .58 + .23 + 1.30 = 2.11$  per cent).

It could, of course, be explained by a substantial decrease in labour-intensity in manufacturing between 1956-59 and 1964; or it could be the almost inevitable inconsistency involved in comparing two independent calculations of the same economic phenomenon. In either case, the authors incline towards the 1964 figures. This means that the calculations in the last three columns of Table 4 (for example) may overstate price effects, if the initial price increases in column 2 are too high. But one very important contribution of Table 4 is quite independent of any absolute error of this kind: a comparison of the relative size of corresponding figures in columns 2, 3 and 4 can be enlightening. Thus the estimates  $12\frac{1}{2}$ ,  $16\frac{1}{2}$  and  $20\frac{1}{2}$  for the leather industry in Table 4 may all be too high. The point is, however, that the eventual price increase by this industry will be about 25 per cent more than the initial increase necessary to cover its higher wage costs; and if all industries achieve parity, its price will be raised again by about this same percentage.

As a final observation, we note the price increases shown in column 4 of Table 4 generally range between 10-20 per cent. Thus, with wage increase in all industries of about 35 per cent, the cost-of-living rises by only about half this amount. So about half the increased wage is eroded by a higher price level. The question is: what of the other half? By what means does labour succeed in raising its standard of living at all? Assuming, as we have, that Canadian productivity does not close on U. S. productivity, the answer is: at the expense of other non-wage income earners, who are assumed in this analysis to have frozen money incomes (and thus falling real incomes) in the face of a rising price level. (The



assumed stability of import prices<sup>1</sup> also moderates the upward drift in prices). It is now evident that we are becoming heavily entangled in severely restrictive assumptions: for example, the assumption that non-wage incomes do not move with substantial changes in the price level; and the assumption that import prices do not change--a premise that requires an exchange rate independent of the Canadian price level.

This raises the whole question of whether, in the face of international competition, prices in an open economy can be raised at all--regardless of how severe the pressure of rising costs. For differentiated products which are not yet priced at the world price plus the full Canadian tariff--i.e., in which all present protection is not 'used'--some price increase is still possible, albeit at the expense of lost sales to imports. But if full protection is now being used, no such margin exists, and short of additional tariff protection<sup>2</sup> the firm increasing its price would be pricing itself out of the domestic market.

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<sup>1</sup>In the 1959 Input-Output analysis of this section, imported and domestic inputs could be distinguished, with the  $a_{ij}$  and  $P_j$  referring to only domestically-produced goods.

<sup>2</sup>It might be interesting to compare the effective protection such industries now receive (on the limiting assumption that it now all goes to labour) with the additional effective protection ( $=\Delta w$ ) they would require to raise their wages to parity.

It is interesting to note how this analysis is related to the effective protection calculation. Setting  $\Delta r_j = 0$ , (2) may be written:

$$\Delta w_j = \frac{\Delta P_j - \sum_i a_{ij} \Delta P_i}{q_j} \quad (11)$$

Assume that any tariff increase ( $\Delta t_j$ ) is reflected in a price increase,



And in export markets it is even more difficult to raise price. If a firm has substantial export sales, and these are at a given international price, price adjustments (to cover higher wage costs) must be even greater on the balance of its sales in the domestic market.

In summary, for firms doing a substantial export business at a given international price, all required price increases would fall on domestic sales, and all the foregoing calculations understate as a consequence. Moreover, we have simply calculated price increase "required" to finance wage parity; we have not passed judgment on whether or not these increases are "feasible" in the face of import competition.

#### A Formalized Statement

To solve the potential general equilibrium effects of wage parity, we recognize that there is an equation similar to equation (2) for each industry. Thus:

$$\Delta P_1 = (a_{11}\Delta P_1 + a_{21}\Delta P_2 \dots) + q_1\Delta w_1 + v_1\Delta r_1$$

$$\Delta P_2 = (a_{12}\Delta P_1 + a_{22}\Delta P_2 \dots) + q_2\Delta w_2 + v_2\Delta r_2$$

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i.e.,

$$\Delta t_j = \Delta P_j$$

(11) now becomes:

$$\text{additional effective protection required} = \Delta w_j = \frac{\Delta t_j - \sum a_{ij} \Delta t_i}{q_j} \quad (12)$$

Effective protection calculations involve solving (12) for  $\Delta w_j$  given  $\Delta t_j$  and all the  $\Delta t_i$ . In our analysis, we reverse the procedure, taking a given (parity)  $\Delta w_j$ , and solving a whole set of equations like (11) for the set of  $\Delta P_j$  and  $\Delta P_i$ .

$$\Delta P_n = (a_{1n} \Delta P_1 + a_{2n} \Delta P_2 \dots) + q_n \Delta w_n + v_n \Delta r_n \quad (13)$$

The solution is then not the solution of one equation for each industry; rather it is the solution of a set of  $n$  simultaneous equations in the  $n$  variable price changes ( $\Delta P_j$ ).

Specifically, we assume that returns for primary factors (other than labour) remain constant:

$$\Delta r_j = 0, \text{ for all } j.$$

Thus the last term in each equation disappears. For any given set of wage changes ( $\Delta w_j$ ), these  $n$  equations can now be solved for the  $n$  unknown prices ( $\Delta P_j$ ). The solution indicates the new equilibrium set of prices, with the price of any product just sufficient to cover the cost of higher-priced inputs.<sup>1</sup>

In matrix notation (13) becomes

$$\Delta P = A' \Delta P + Q \Delta w \quad (14)$$

where  $\Delta P$  is a column vector of price changes

$A'$  is a matrix of input-output coefficients ( $a_{ij}$ ); this is the transpose of the matrix used in familiar input-output analyses;

$\Delta w$  is a column vector of wage changes implied by parity, and

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<sup>1</sup>For a further discussion of primary and secondary price adjustments, see W. Leontief, The American Economy, and R. J. Wonnacott, Canadian-American Dependence: An Interindustry Analysis of Production and Prices (Amsterdam: North Holland Press, 1961). This analysis is recognized as a set of variations on the Leontief dual price model.

$Q$  is a diagonal matrix containing the elements  $q_1, q_2, \dots, q_n$ .

(14) can be written

$$(I - A')\Delta P = Q\Delta w \quad (15)$$

and, since  $(I - A')$  is non-singular:

$$\Delta P = (I - A')^{-1}Q\Delta w \quad (16)$$

With a constant  $A'$  and  $Q$ , a unique solution for equilibrium price changes ( $\Delta P$ ) is derived from a given vector of wage increases ( $\Delta w$ ). This vector of wage increases will have entries in those industries in which wage parity is achieved, and zeros elsewhere.

For easier practical manipulation, a slight variation is useful. The vector  $\Delta w$  is replaced by  $\Delta Wt$ , where  $\Delta W$  is a diagonal matrix of all parity wage changes.  $t$  is a dummy column vector, with any element  $t_j$  set equal to 1 if wage parity occurs in that industry, and 0 if it does not. Then the system can be written:

$$\Delta P = [I - A']^{-1}Q\Delta Wt \quad (17)$$

or

$$\Delta P = Et$$

where  $E$  is the matrix  $[I - A']^{-1}Q\Delta W$ . The elements of the  $E$  matrix represent the change in the price of industry  $i$  due to wage parity in industry  $j$ . Table 2 is just this  $E$  matrix set out in full, at a 28-industry level of aggregation, and assuming exchange-adjusted parity. The corresponding  $E$  matrices for a 42-industry aggregation are set out in Tables A2 and A3, in Appendix A.

## CHAPTER IV

### CONCLUSIONS

We now confront the theoretical discussion in Chapter I with the above empirical estimates to answer the question: "What would be the aggregative effects of wage parity?" It is clear from the preceding chapter that the answer depends critically on key assumptions at various stages of the analysis. The whole set of combinations and permutations of these assumptions yield a wide range of outcomes; no single one of these is very likely, but some are more likely than others. While all possibilities cannot possibly be described, it is feasible to consider a few--at various stages indicating the major respects in which our estimates overstate on the one hand, and understate on the other. Our hope, in this admittedly rough sketch, is to bring the key issues into better focus. We round our estimates unmercifully; to do otherwise would suggest a precision this analysis cannot support.

#### A. Nominal Parity

This would involve an average increase of 25 per cent in Canadian money wages. With no changes in relative productivity, and other factors held to their present money incomes, this implies price pressures, ranging from 3 - 20 per cent, depending on the sector involved (column 4, Table 5) or an average pressure in the neighbourhood of 10 per cent.<sup>1</sup>

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<sup>1</sup>As a round number, 10 per cent may be too high on average. The actual figure used in all calculations below was approximately 9 per cent.



An overall price increase of about 10 per cent could obviously not be supported in an open economy like the Canadian. The expected result would be balance of payments pressures resulting in a depreciation or devaluation of the Canadian dollar.

The adjustment to rising wages and prices of course need not be entirely absorbed by exchange depreciation. The use of tariffs and quotas to defend the balance of payments is another option; although these are assumed away for now, they will be considered later. Alternatively, higher Canadian wages could result in severe short term unemployment; since this would reduce income, imports and hence the payments imbalance, this would reduce the necessity of exchange devaluation. In this study it is assumed that unemployment does not occur; hence the implicit assumption is introduced of a sufficiently easy monetary and fiscal policy to maintain full employment (including, for example, an expansion of the domestic money supply to accommodate price increases). In these circumstances adjustment pressures would be transferred fully onto the exchange rate. The point here is that if part of the adjustment is not so transferred, but rather takes the form of unemployment, the cost of wage parity would be even higher than projected in this study, since real income (potential output) would be foregone; moreover, there might also be partial loss of the unemployed Canadian labour force through emigration or reduced immigration.

A careful estimate of the effect on the exchange rate of such inflationary pressure would require an examination of individual price pressures, along with each product's sensitivity to import competition and loss of foreign markets; ideally we should describe how the trade flows of each product are a function of its price change, then solve for the Canadian dollar

that returns the Canadian Balance of Payments to its present equilibrium.<sup>1</sup> Even if this detailed analysis were possible, it would still miss the domestic diversion of resources that such an uneven intersectoral pattern of price pressures would induce--with this resource diversion making the eventual pattern of realized price increases less uneven than Table 5 suggests.

This forces us back to a simpler, rough-and-ready estimate: to keep the international price of Canadian goods from rising, a 10 per cent increase in the domestic price level would have to be offset by a decrease in the exchange rate by about 10 per cent.

The industry implications of this can be reviewed in the last column of Table 5. A possible expansion is implied in those industries for which this exchange depreciation more than compensates for the domestic price pressure (column 4); while pressure to contract would fall on those sectors for which this exchange depreciation would fall short of domestic price pressures.

With a depreciation of just less than 10 per cent we are thinking in terms of roughly an 85¢ Canadian dollar; but this projection may err substantially in either direction. On the one hand, 85¢ may be too low because of the following assumptions:

1. All balance of payments pressures exert themselves in a revision of the exchange, rather than in some other way (tariff increases, quotas,

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<sup>1</sup>And also project likely effects of price change on capital flows.

etc.). Moreover, it is assumed that 'unused' Canadian protection does not now exist. If a) some products are priced in Canada below the foreign price plus the Canadian tariff, and b) their price may be raised without inducing imports,<sup>1</sup> then some price increase in Canada may occur without inducing Balance of Payments pressures. (This sort of adjustment has the same effect as an increase in the Canadian tariff; a higher Canadian price is protected by previously unused portions of the present tariff, rather than an increase in the tariff).

2. It is assumed that there is no closing of the productivity gap. Such productivity change might be induced in Canada by higher wage cost. Or it might occur for other reasons; some autonomous business or government policy change (as, for example, in the auto industry) might generate a productivity increase that would, at least in part, cover the parity wage increase. It must be recognized however that autonomous productivity changes could operate in the other direction as well--increasing the productivity gap and inducing an even lower exchange.

3. Our interindustry analysis abstracts from substitution effects; strictly speaking, it describes a situation in which firms cannot substitute lower-priced for higher-priced inputs. To the degree that such substitution would allow firms to hold down their cost increase, price and exchange effects would be moderated.

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<sup>1</sup>Note that (a) and (b) are two separate conditions; (b) does not necessarily follow from (a).

4. This analysis includes the effect of wage parity not only across all manufacturing, but also in non-manufacturing. But the great pressure and bargaining strength is now being felt in manufacturing, and only in selected sectors there. Across-the-board wage parity is an assumption that the authors find implausible; thus this paper must be regarded as a hypothetical and analytical study, rather than a prediction. Or to restate: we analyse the possible (price and exchange) effects of a very improbable initial condition (wage parity). In our view it is an interesting example of how important a hypothetical analysis can be in economic policy formulation; but it is no more than that.

We now turn to the reasons why our projection of an 85¢ dollar may be too high.

1. Our interindustry price analysis is based on the assumption that import prices remain constant. Yet with rising Canadian prices and a falling Canadian dollar, import prices would also rise, generating a greater equilibrium price increase than our estimated 10 per cent.

2. Other factors are assumed to take not only a reduction in their relative share of national income (their money returns remain constant, while wages rise), but even more serious, a reduction in their absolute real income (their money returns remain constant as prices rise). This is obviously a very strong assumption. But if one considers rents, this assumption might be made even stronger. The effect of a very large wage increase might be to reduce not only the relative income and real income of rentiers, but also their money income. In some instances economic rent going to



other factors might be completely eliminated--or more precisely, appropriated by labour. But when we turn to other forms of non-labour income, it seems implausible to argue that a reduction in real income would be tolerated--for a number of reasons. For example, other factors may be able to exercise bargaining power like labour; or, even if the markets for their services are completely competitive, the possibility of migrating to the U. S. may make their supply of services very elastic, thus preventing real income reductions. If for any such reason they will not tolerate a real income reduction, then the change in Canadian prices and the exchange is underestimated. There would now be no domestic factors to carry (with a lower real income) the higher real income of labour. And in those circumstances equilibrium would be restored only at a 25 per cent higher money return to all (labour and non-labour) factors and a 25 per cent higher price level.<sup>1</sup> And the (relative and absolute) real income of all factors would remain unchanged. The further implication is a 20 per cent lower exchange,<sup>2</sup> or about a 75¢ Canadian dollar. Clearly, the ability

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<sup>1</sup>Curiously, this eventual result is the same with the weak assumption that non-labour factors resist a lower real income, or the stronger assumption that they, like labour initially achieve a 25 per cent increase in their money income. The only difference is that with the latter assumption there is an immediate 25 per cent change in money incomes and prices, while with the former assumption the 25 per cent change represents only the eventual equilibrium.

<sup>2</sup>Note that any given price increase (i.e., 25 per cent) is offset by a somewhat smaller exchange devaluation (20 per cent) as follows. Let the old price level be 100, and exchange be 1.00. With a 25 per cent inflation, the new price level becomes 125 and with a 20 per cent devaluation the new exchange

of non-labour factors to protect themselves from a reduction in real incomes becomes a critical issue. To the degree that they succeed fully a 75¢ dollar is implied; if they are unable to protect their present real income (and can only maintain their present money income) an 85¢ dollar is implied.

3. In this analysis it is assumed that there is no further wage increase to compensate for the erosion of rising prices. In fact, it might be expected that labour would attempt to protect its real wage increase by further money increases. Nominal parity may remain a labour objective at a 92½¢ dollar; but at a 75-85¢ dollar, the objective is almost certainly to become "adjusted" parity. Thus with substantial devaluation, labour might lose any "exchange illusion,"<sup>1</sup> and shift its objective from nominal to adjusted parity.

#### B. Adjusted Parity

What happens if the unions succeed in this objective?

A 75¢ - 85¢ Canadian dollar attributable to nominal parity

implies an immediate and automatic wage claim of another 20-35 per cent.

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rate becomes .80; thus the international price of this country's goods becomes  $125(.8) = 100$ , as before.

<sup>1</sup>Defined like "price illusion". Specifically, labour concentrates only on its money wage without regard for movements in the exchange.

But even this would not generate adjusted parity, since it would set off a further rise in prices and devaluation.

The process is like running up a down escalator, which turns out not to be an escalator after all, but a treadmill; the more effort expended in running up, the more rapidly it moves down. If non-labour factors succeed in protecting their real income and there are no concurrent productivity improvements, the two speeds are identical, with labour unable through this effort to improve its position. Labour cannot reach a higher real income level, short of productivity gains or an income redistribution in its favour. If non-labour factors can hold only their present money income (but not their real income), there exists a new equilibrium consistent with adjusted parity involving a Canadian dollar of about<sup>1</sup> 75¢.

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<sup>1</sup>Equilibrium under adjusted parity requires that labour achieve an initial 35 per cent money wage increase (see last item in column 7, Table I), plus whatever money wage increase is necessary to offset exchange depreciation (i.e., to offset domestic price increase); this implies a 35 per cent real wage increase, or over double the 15 per cent real increase labour would achieve from nominal parity (recall that nominal parity involved a 25 per cent rise in money wages and a 10 per cent price increase--thus a real wage increase of less than 15 per cent). Applying this multiple (i.e.,

$\frac{35\%}{\text{less than } 15\%} \approx 2.5$ ) we calculate the required money wage increase to be 2.5 (25 per cent) or about 60 per cent, and the resulting price increase to be 2.5 (10 per cent) or about 25 per cent. This implies a dollar depreciation of about 20 per cent.

But if non-labour factors will not tolerate any reduction in real income, then the process is one of continuous escalation of the wage and price level, and a continuous dollar depreciation.

The discussion so far is summarized in the first two columns of Table 6. While any move to parity unaccompanied by productivity increases will bring a depreciation, only a special subset of circumstances will induce the continuous process of depreciation that is sometimes assumed.

But even in these special circumstances, there remains one possible escape from continuous devaluation: insulate the Balance of Payments from the pressure of rising domestic prices by quota or tariff restrictions. If enough stops of this kind are pulled, adjusted parity is possible--even (conceivably) at the present  $92\frac{1}{2}$ ¢ dollar. Domestic prices would of course be higher; in these circumstances there would be an important difference between adjusted parity (which could be achieved, but would now become a less meaningful goal) and real parity (which now becomes the meaningful objective, but is even less attainable than before). International trade theory suggests that trade restrictions would be likely to lead to lower real income (at least for Canadians on average, though not necessarily for every sector). The result of trade restrictions, with the associated inefficiencies of resource allocation, would be an increase rather than a decrease in the productivity gap. Since in any circumstances, real parity can be achieved only by closing the productivity gap, it is difficult to justify a (high tariff) policy that would have exactly the opposite effect. Or to restate: this line of defence (higher tariffs) would move the country away from--rather than towards--a real parity goal.



TABLE 6

Estimated Equilibrium Value of Canadian Dollar (assuming productivity increase in Canada and the U.S. equal, and all Balance of Payments pressures absorbed by exchange rate).

Labour Objective	Nominal Parity	Adjusted Parity	Real Parity
Non-Labour Income Constant in:			
Money terms	about 85¢	about 75¢	about 80¢
Real terms	about 75¢	continuous depreciation	continuous depreciation

⇒

Possible escape:  
tariffs, quotas.  
Result? Labour  
objective changed ⇒  
to real parity?

⇒

No escape,  
short of  
closing  
productivity  
gap.

Earlier we concluded that a substantial devaluation of the exchange would likely cure labour of any exchange illusion, and result in labour shifting from a nominal to an adjusted parity objective. A parallel observation is now appropriate: tariff-protected price increases may cure labour of any 'price illusion'; at that point real parity rather than adjusted parity may become the labour objective.

C. Real Parity

What are the implications of this? As long as all balance of payments pressures are absorbed by the exchange, the results with real parity (column 3) would closely parallel the results with adjusted parity (column 2). The big difference now is that tariff policy no longer provides an escape from the continuous devaluation in the last row.<sup>1</sup> Higher tariffs bring higher prices, thus preventing labour from achieving its real income objective. This objective can in fact only be achieved by closing the productivity gap.

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<sup>1</sup>There is also a difference in comparing elements in the first row, where non-labour factors tolerate a real income reduction. Since they hold their incomes constant in money terms only (because either they lack bargaining power, and/or they suffer from their own set of illusions), a 75¢ dollar would be feasible. Its value, in fact, should be even higher: since the exchange-adjusted cost of living is lower in Canada, real parity would involve a smaller wage claim by labour than adjusted parity--hence a higher equilibrium exchange rate--of about 80¢. (Specifically we note from Chapter I that the cost of living (without exchange adjustment) is about equal in the two countries. Thus labour's initial claim would be

To sum up: if non-labour factors cannot prevent a reduction in their real income, row 1 is relevant and labour may be able to get parity (at a lower exchange rate). But although there is some prospect labour might be able to squeeze (or even eliminate) economic rents, it is not in as strong a position vis-a-vis other non-labour factors. If such an income redistribution in labour's favour is not feasible, row 2 is relevant, and the only parity labour can achieve must be based on its own (price or exchange) illusions, or one based on equal productivity. In the last analysis, productivity remains the key to real income gains; it further follows that if the present productivity gap is closed by say, half, because of parity wages, all effects implied in Table 6 should likewise be cut in half.<sup>1</sup>

With some regret, we recognize that this study may erroneously be viewed as anti-labour, since we have focused on the effects of a sudden increase

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a 25 per cent wage increase, to be followed by whatever wage increases are necessary to offset any price increase--in short, a 25 per cent real wage increase. Using an argument parallel to the one in the previous footnote--and noting that the multiple is now just less than 2, rather than about 2.5--we calculate the necessary wage increase as less than 50 per cent, with a domestic price increase of 15-20 per cent, and an exchange depreciation of about 15 per cent).

<sup>1</sup>Bearing in mind that 'continuous depreciation' remains 'continuous depreciation' albeit only half as fast.

in wages, rather than profits or other factor returns. It must be pointed out that a similar analysis might be undertaken for any other factor, seeking an increased return without an equivalent increase in productivity. The same implications follow, with the same general conclusion: unless the fundamental productivity problem is solved or Canadian income redistributed, the process must be illusory, or self-defeating. The smaller the factor, the less severe the consequences, of course; (just as, the smaller and less influential the union, the less severe the consequences of wage parity).

D. Conclusions: other options

We cannot emphasize too strongly that this is an analysis of a hypothetical situation; it is not a prediction. We have examined in some detail the logical consequences of hypothetical wage parity without productivity parity, on the assumption that the entire adjustment falls on prices. On the other hand, a prediction would require recognition that a parity increase will simply not occur in every industry, and where it does occur there may be some accommodation in the form of induced productivity increase. The issue then reduces to the effect of the remaining wage increase that is not offset by productivity increase. The adjustment to this will be a much more complex one than the simple price adjustment analyzed here. Instead there would be a whole set of adjustments, occurring in some (indefinable) combination; two important possibilities should now be considered in some detail.

First, monetary and fiscal policy may not be sufficiently easy to completely accommodate wage and price increases, with the result being unemployment; (indeed one would expect a government faced with the two problems of domestic unemployment and balance of payments deterioration to institute a



set of policies which alleviates each to some degree, rather than completely solving one at the expense of the other). We have already pointed out that unemployment is a more costly form of adjustment than price change, since unemployment raises the question not only of foregone real income, but also loss of the labour force. Analysing this case would also be much more difficult; it would involve a specification of migration response and of how rapidly unemployment would erode the wage level over time; or, alternatively, if there were no erosion of Canadian wages and prices, the issue would reduce to the time required for a more rapid price increase in other countries to overtake the Canadian price level. Such an analysis of the consequences of unemployment might of course be undertaken. But it should be recognized that this would be a more difficult study.

There is one other theoretical adjustment that should be mentioned. We have considered easy monetary and fiscal policies to maintain full employment in the face of price increases, recognizing that this combination would generate balance of payments deterioration. But why not a tight monetary policy to protect the balance of payments, along with an extremely easy fiscal policy to maintain domestic full employment? As a practical, as opposed to theoretical, solution, this procedure of forcing the adjustment onto the international capital account may be rejected on several grounds.

First, the burden this would throw on fiscal policy would be immense, with a budget deficit of undefined proportions involved. Fiscal policy alone would have to make the full accommodation for price increases; (recall

that in our analysis this accommodation was covered by both easy fiscal and monetary policy). And fiscal policy would have to be even easier than this, since it would also have to offset the restrictive domestic effects of tight money.

Second, the degree of monetary restraint required would also be quite extraordinary. Continued upward pressure would be required on Canadian interest rates until the current account deficit (induced by Canadian price increases) would be covered by an increased capital inflow. Such a policy would increase Canadian dependence on foreign capital to a very great degree; for this reason alone it is doubtful that it would be considered as a feasible option. Moreover, it would involve other major problems: even though the foreign supply of capital may be an elastic one, substantially higher Canadian interest rates would still be required to induce such a massive injection of capital. Given the present high interest levels, it is difficult to see how such a substantial further increase would be tolerated. It implies an income redistribution from borrowers to lenders (i.e., from labour to capital) in clear contradiction to the original objective of wage parity.

This points to the conclusion that any form of adjustment raises severe problems. But the price adjustment analyzed in this paper--painful though it may be--would probably be more acceptable than any other--at least to Canadian labour. This leads us finally to venture the following hope. Although the Canadian

labour objectives will naturally include higher wages, in practice contracts will be a realistic reflection of productivity differences. And even more important: a prime objective of government policy and industry and union management should be to close that productivity gap. As that occurs, Canadians can have wage parity with none of the above unfavourable consequences.

TABLE A1

The 28 and 42 Industry Classifications Compared

Industry No. in 28 Indus. Classification	Industry No. in 42 Indus. Classification	Industry
1	1	Agriculture
2	2	Forestry
3	3	Fishing, hunting, trapping
4	4	Metal mining, smelting, refining
5	5	Coal mining, crude petroleum, natural gas
6	6	Non-metal mining, quarrying, prospecting
7	7	Meat products
	8	Dairy products
	9	Fish processing
	10	Fruit and vegetable preparations
	11	Grain mill products
	12	Bakery products
	13	Carbonated beverages
	14	Alcoholic beverages
	15	Confectionery and sugar refining
	16	Miscellaneous food preparation
8	17	Tobacco and tobacco products
9	18	Rubber products
10	19	Leather products
11	20	Textile products (except clothing)
12	21	Clothing (textile and fur)
13	22	Furniture
14	23	Wood products (except furniture)
	24	Paper products
15	25	Printing, publishing, and allied industries
16	26	Primary iron and steel
17	27	Agriculture implements
	28	Iron and steel products, n.e.s.
	29	Transportation equipment
	30	Jewellery and silverware (including watch repair)
22	31	Non-ferrous metal products, n.e.s.
16	32	Electrical apparatus and supplies
18	33	Non-metallic mineral products
19	34	Products of petroleum and coal
20	35	Chemicals and allied products
21	36	Miscellaneous manufacturing industries
22	37	Construction
23	38	Transportation, storage, trade
24	39	Communication
25	40	Electric power, gas and water utilities
26	41	Finance, insurance, real estate
27	42	Service industries (excluding public administration and defense)
28		

Note: For the relations of these industries to the D.B.S. Standard Industrial Classification (1948), see D.B.S. publication 13-513, op. cit., Table 10 and pages 26-34.



% Price Increase in Each Industry Resulting from  
<sup>Adjusted</sup>  
~~Real~~ Wage Parity in Any Industry 1959

$$E = [I - A]^{-1} Q \Delta W$$

TABLE A-2

Adjusted WAGE  
 When ~~Real~~ Parity  
~~Costs~~ Achieved Here

Prices Rise Here ↓

1 Agriculture

2 Forestry

1 Agriculture	2.00410	0.02910
2 Forestry	0.02065	15.76224
3 Fishing, hunting, trapping	0.00137	0.03414
4 Metal mining, smelting, refining	0.00506	0.05624
5 Coal mining, crude petroleum, prospecting	0.00145	0.01474
6 Non-metal mining, quarrying, prospecting	0.00281	0.05666
7 Meat products	1.01548	0.05189
8 Dairy products	0.98853	0.07844
9 Fish processing	0.00308	0.05957
10 Fruit & vegetable preparation	0.22093	0.17449
11 Grain mill products	0.62972	0.18781
12 Bakery products	0.22813	0.22861
13 Carbonated beverages	0.02867	0.15504
14 Alcoholic beverages	0.05187	0.18152
15 Confectionery and sugar refining	0.11115	0.13942
16 Miscellaneous food preparation	0.20311	0.12777
17 Tobacco and tobacco products	0.67952	0.21240
18 Rubber products	0.01028	0.05743
19 Leather products	0.11467	0.11618
20 Textile products (except clothing)	0.01787	0.06794
21 Clothing (textile and fur)	0.01149	0.05308
22 Furniture	0.00779	0.28054
23 Wood products (except furniture)	0.04134	4.25428
24 Paper products	0.03505	0.22201
25 Printing, publishing and allied industries	0.01069	0.28800
26 Primary iron and steel	0.00198	0.03752
27 Agricultural implements	0.00385	0.07740
28 Iron and steel products n.e.s.	0.00217	0.05870
29 Transportation equipment	0.00300	0.05862
30 Jewellery and silverware (including watch repair)	0.00310	0.07639
31 Non-ferrous metal products n.e.s.	0.00286	0.05409
32 Electrical apparatus and supplies	0.00346	0.07005
33 Non-metallic mineral products	0.00726	0.11302
34 Products of petroleum and coal	0.00183	0.02952
35 Chemicals and allied products	0.05699	0.11254
36 Miscellaneous manufacturing products	0.00703	0.12078
37 Construction	0.01057	0.39956
38 Transportation, storage, trade	0.00315	0.06937
39 Communication	0.00181	0.04357
40 Electric power, gas, water utilities	0.00452	0.07866
41 Finance, Insurance, Real Estate	0.00277	0.05230
42 Service Industries (excluding public administration and defense)	0.01470	0.08850

	3 Fishing, hunting, trapping	4 Metal mining, smelting, refining	5 Coal mining, crude petroleum, natural gas	6 Non-metal mining, quarrying, and prospecting	7 Meat products	8 Dairy products	9 Fish processing	10 Fruit and vegetable preparations
1	0.00104	0.01187	0.33119	0.02307	0.01328	0.00084	0.00367	0.00010
2	0.00002	0.01646	0.27621	0.00639	0.00046	0.00005	0.00006	0.00003
3	5.50844	0.00938	0.27646	0.00806	0.00098	0.00016	0.00005	0.00004
4	0.00008	11.13622	0.17094	0.05836	0.00425	0.00027	0.00023	0.00012
5	0.00003	0.00901	13.23359	0.00655	0.00139	0.00013	0.00008	0.00007
6	0.00005	0.07194	0.28076	9.49231	0.00198	0.00019	0.00011	0.00011
7	0.00426	0.01592	0.23866	0.02253	4.55309	0.00067	0.01509	0.00017
8	0.00054	0.01280	0.26233	0.02882	0.01021	5.88635	0.00187	0.00200
9	1.97718	0.01938	0.25385	0.01822	0.00126	0.00021	7.03533	0.00019
10	0.00041	0.03453	0.18855	0.07866	0.19136	0.01917	0.00134	8.97950
11	0.01121	0.01680	0.21515	0.03449	0.11112	0.00774	0.04010	0.00047
12	0.00227	0.01305	0.23531	0.02204	0.34952	0.05754	0.00793	0.03983
13	0.00018	0.01828	0.31567	0.02027	0.00911	0.00685	0.00041	0.00194
14	0.00013	0.01140	0.14802	0.02930	0.00525	0.00124	0.00032	0.00517
15	0.00014	0.01392	0.10912	0.01875	0.02318	0.00091	0.00042	0.00429
16	0.00037	0.00909	0.11452	0.01894	0.02646	0.00689	0.00121	0.01527
17	0.00047	0.03449	0.20447	0.01871	0.00739	0.00102	0.00144	0.00053
18	0.00022	0.02616	0.14170	0.02933	0.01076	0.00062	0.00055	0.00029
19	0.00201	0.01156	0.09348	0.01148	0.26588	0.00034	0.00646	0.00018
20	0.00012	0.01428	0.07344	0.01835	0.00843	0.00030	0.00038	0.00011
21	0.02932	0.00893	0.05131	0.00917	0.00255	0.00025	0.00018	0.00012
22	0.00009	0.04717	0.09535	0.01153	0.00526	0.00034	0.00025	0.00018
23	0.00007	0.01422	0.16336	0.00930	0.00205	0.00023	0.00018	0.00013
24	0.00008	0.03498	0.22548	0.10168	0.00353	0.00029	0.00023	0.00016
25	0.00009	0.01406	0.12246	0.02870	0.00414	0.00040	0.00024	0.00023
26	0.00004	0.42639	0.72411	0.24317	0.00162	0.00020	0.00009	0.00012
27	0.00006	0.09421	0.18343	0.05585	0.00341	0.00023	0.00016	0.00013
28	0.00005	0.19174	0.20433	0.06315	0.00160	0.00020	0.00010	0.00019
29	0.00010	0.09043	0.14812	0.03388	0.00272	0.00026	0.00014	0.00012
30	0.00007	2.25004	0.10836	0.01876	0.00248	0.00039	0.00015	0.00023
31	0.00006	3.68045	0.16725	0.03761	0.00226	0.00020	0.00013	0.00018
32	0.00007	0.34745	0.10443	0.02190	0.00297	0.00033	0.00017	0.00019
33	0.00006	0.02745	0.36202	0.88896	0.00268	0.00027	0.00016	0.00017
34	0.00005	0.01016	4.52166	0.01891	0.00162	0.00024	0.00010	0.00015
35	0.00150	0.10841	0.20161	0.14343	0.10024	0.00285	0.00518	0.00036
36	0.00011	0.11897	0.15031	0.01310	0.00575	0.00280	0.00028	0.00026
37	0.00013	0.10688	0.19197	0.21710	0.00604	0.00052	0.00034	0.00028
38	0.00008	0.01423	0.15836	0.01833	0.00179	0.00047	0.00012	0.00031
39	0.00007	0.02141	0.12327	0.01177	0.00169	0.00052	0.00012	0.00034
40	0.00007	0.07272	0.46866	0.01869	0.00390	0.00021	0.00021	0.00009
41	0.00008	0.01323	0.08682	0.02974	0.00179	0.00052	0.00013	0.00036
42	0.00134	0.01334	0.09135	0.01088	0.02347	0.01003	0.00190	0.00713



	17 Tobacco and tobacco products						
	16 Miscellaneous food preparations						
	15 Confectionery and sugar refining						
	14 Alcoholic beverages						
	13 Carbonated beverages						
	12 Bakery products						
	11 Grain mill products						
1	C.26708	0.00021	0.00006	0.00180	C.00307	0.00306	0.00000
2	0.00276	0.00007	0.00002	0.00005	0.00006	0.00007	0.00000
3	C.00021	0.00010	C.00003	0.00010	C.00006	0.00013	0.00000
4	0.00077	0.00029	0.00008	0.00048	C.00022	0.00032	0.00000
5	0.00023	0.00017	0.00005	C.00014	C.00009	0.00011	0.00000
6	0.00043	0.00025	0.00007	0.00020	0.00013	0.00019	0.00000
7	C.13546	0.00034	0.00009	0.00130	C.00441	0.00667	0.00000
8	0.13186	C.00031	0.00009	0.00097	C.03516	0.00659	0.00000
9	0.00048	0.00044	0.00012	0.00008	0.00015	0.00021	0.00000
10	C.05040	0.00076	0.00021	0.02725	C.29399	0.03818	0.00000
11	3.05414	0.00081	C.00022	0.01637	0.01725	0.03245	0.00000
12	C.52033	14.20927	0.00022	0.00341	0.28476	0.11075	0.00000
13	0.00778	0.00139	5.03739	0.00116	C.73488	0.27741	0.00000
14	0.01452	0.00073	0.00020	9.23371	C.03376	0.35848	0.00000
15	0.02065	0.00039	0.00011	0.00047	7.58183	0.08222	0.00000
16	0.07584	C.00058	0.00016	0.01155	C.09840	4.10924	0.00000
17	0.05074	0.00126	0.00035	0.00078	C.00141	0.00141	0.08146
18	0.00159	0.00069	0.00019	0.00108	0.00053	0.00079	0.00000
19	C.01536	0.00042	0.00011	C.00024	C.00366	0.00070	0.00000
20	0.00202	0.00023	0.00006	0.00079	0.00041	0.00450	0.00000
21	0.00162	0.00026	0.00007	C.00032	C.00021	0.00157	0.00000
22	0.00114	0.00044	0.00012	0.00038	0.00026	0.00046	0.00000
23	0.00555	C.00031	0.00009	C.00021	C.00023	0.00150	0.00000
24	0.00478	0.00035	0.00010	C.00035	C.00028	0.00196	0.00000
25	0.00155	C.00053	0.00015	C.00042	C.00029	0.00066	0.00000
26	0.00032	0.00028	0.00008	0.00015	C.00012	0.00017	0.00000
27	0.00054	C.00030	0.00008	C.00025	C.00017	0.00023	0.00000
28	0.00037	0.00046	0.00013	C.00012	0.00017	0.00018	0.00000
29	0.00047	C.00032	0.00009	0.00025	C.00017	C.00026	0.00000
30	0.00052	0.00056	0.00015	C.00022	C.00022	0.00024	0.00000
31	0.00047	0.00044	0.00012	C.00021	C.00018	0.00022	0.00000
32	0.00056	0.00045	0.00012	0.00029	C.00021	0.00029	0.00000
33	C.00111	0.00035	C.00010	C.00028	0.00030	0.00535	0.00000
34	0.00031	0.00035	0.00010	0.00014	C.00014	0.00015	0.00000
35	0.01441	C.00080	0.00022	0.01222	C.00387	0.00571	0.00000
36	0.00107	0.00061	0.00017	0.00043	0.00033	0.00038	0.00000
37	0.00162	0.00065	0.00018	0.00064	C.00039	0.00088	0.00000
38	0.00054	0.00074	0.00021	0.00009	0.00023	0.00023	0.00000
39	0.00037	0.00082	C.00023	C.00008	C.00025	0.00022	0.00000
40	0.00068	0.00021	0.00006	0.00045	0.00019	0.00029	0.00000
41	0.00050	0.00085	0.00024	0.00009	0.00026	0.00024	0.00000
42	0.00439	0.01706	0.00471	0.00028	0.00470	0.00297	0.00000

	25 Printing, publishing and allied industries	24 Paper products	23 Wood products (except furniture)	22 Furniture	21 Clothing (textile and fur)	20 Textile products (except clothing)	19 Leather products	18 Rubber products
1	0.03502	0.03305	0.01314	0.00665	0.00092	0.02172	0.01001	0.10588
2	0.01121	0.00604	0.01014	0.00251	0.00048	0.01151	0.00076	0.01242
3	0.01659	0.01059	0.03364	0.00351	0.00079	0.08204	0.00473	0.01349
4	0.03317	0.01585	0.05685	0.00608	0.00079	0.00549	0.00123	0.03485
5	0.04847	0.00931	0.00894	0.00323	0.00067	0.00246	0.00097	0.03722
6	0.05014	0.06664	0.05677	0.00583	0.00151	0.00419	0.00208	0.04517
7	0.05985	0.04512	0.01859	0.01108	0.00128	0.01344	0.00652	0.07330
8	0.06265	0.07714	0.02027	0.00860	0.00106	0.01317	0.00621	0.07465
9	0.07396	0.03704	0.03915	0.00954	0.00118	0.02328	0.00353	0.05810
10	0.11481	0.19018	0.03007	0.01124	0.00124	0.00832	0.00390	0.07282
11	0.13862	0.19080	0.01572	0.01583	0.00215	0.04156	0.00689	0.05471
12	0.13047	0.27332	0.01465	0.01320	0.00146	0.01376	0.00456	0.05794
13	0.15791	0.15279	0.04322	0.01124	0.00132	0.01016	0.00316	0.12507
14	0.08502	0.22122	0.02148	0.00725	0.00080	0.00474	0.00243	0.03464
15	0.07670	0.16930	0.00640	0.00532	0.00057	0.02115	0.00218	0.01846
16	0.09400	0.15177	0.00906	0.00860	0.00088	0.00572	0.00288	0.02566
17	0.11575	0.23475	0.03434	0.01109	0.00127	0.01069	0.00550	0.05449
18	0.08759	0.06036	0.01204	0.00851	0.00133	0.02776	0.07034	7.71039
19	0.07414	0.07848	0.07041	0.00794	0.00724	0.04348	16.72850	0.10886
20	0.04229	0.06573	0.02036	0.00503	0.00070	8.73534	0.03426	0.03136
21	0.06527	0.05458	0.01252	0.00478	0.00533	2.89416	0.01577	0.02454
22	0.06991	0.04036	0.31555	0.37559	0.00124	0.23380	0.10073	0.05709
23	0.04595	0.02242	5.58214	0.00797	0.00091	0.00562	0.00162	0.01719
24	0.06147	4.04895	0.02062	0.00800	0.00100	0.02833	0.02039	0.02003
25	11.88095	0.87142	0.01088	0.00760	0.00070	0.00766	0.00516	0.01751
26	0.04443	0.02403	0.02318	0.00850	0.00100	0.00335	0.00158	0.03424
27	0.04516	0.02854	0.07172	0.00787	0.00215	0.03169	0.06293	0.45252
28	0.05686	0.03163	0.04097	0.00770	0.00072	0.00247	0.00123	0.02103
29	0.04231	0.02914	0.03773	0.02267	0.02201	0.03326	0.01946	0.26002
30	0.07216	0.06285	0.03439	0.00901	0.00087	0.00322	0.00226	0.01563
31	0.09200	0.02804	0.04080	0.01059	0.00121	0.00390	0.00183	0.02347
32	0.06251	0.04858	0.04095	0.10005	0.00076	0.02309	0.00278	0.05419
33	0.05973	0.11079	0.03248	0.00913	0.00113	0.01551	0.00225	0.04106
34	0.06282	0.02672	0.01021	0.00789	0.00094	0.00406	0.00176	0.06067
35	0.10829	0.13118	0.04517	0.01033	0.00110	0.00979	0.00257	0.02977
36	0.08836	0.10942	0.04441	0.00719	0.00114	0.02561	0.09737	0.03958
37	0.08140	0.12180	0.25121	0.02144	0.00141	0.00771	0.00320	0.04556
38	0.13994	0.05793	0.02909	0.04190	0.00437	0.00863	0.00726	0.04881
39	0.23082	0.03480	0.01990	0.03631	0.00100	0.01365	0.00260	0.05027
40	0.04642	0.02829	0.07176	0.01545	0.00045	0.00251	0.00110	0.01660
41	0.17425	0.02634	0.03677	0.04240	0.00060	0.00234	0.00116	0.00803
42	0.76320	0.08314	0.02928	0.05608	0.00659	0.00503	0.00352	0.01203



	32 Electrical apparatus and supplies	31 Non-ferrous metal products, n.e.s.	30 Jewellery and silverware (including watch repairs)	29 Transportation equipment	28 Iron and steel products	27 Agriculture implements	26 Primary iron and steel
1	0.03059	0.00625	0.00030	0.12661	0.24189	0.00478	0.03018
2	0.01868	0.01725	0.00012	0.14042	0.41707	0.00005	0.04481
3	0.02072	0.00406	0.00074	0.25400	0.09706	0.00000	0.01902
4	0.13038	0.00910	0.00036	0.15611	0.27202	0.00001	0.03561
5	0.02610	0.00491	0.00018	0.20809	0.15669	0.00000	0.02351
6	0.04218	0.00830	0.00026	0.51735	0.21194	0.00001	0.03970
7	0.05327	0.00785	0.00058	0.13678	0.33229	0.00242	0.03899
8	0.04823	0.00710	0.00047	0.14159	0.29474	0.00236	0.03567
9	0.06444	0.00839	0.00069	0.18099	0.70386	0.00001	0.07395
10	0.09079	0.01319	0.00073	0.14806	1.52274	0.00077	0.15152
11	0.06013	0.01027	0.00105	0.17757	0.19637	0.00150	0.02828
12	0.05607	0.00891	0.00063	0.15547	0.14013	0.00057	0.02153
13	0.04653	0.01058	0.00036	0.09267	0.48212	0.00007	0.05214
14	0.06229	0.00637	0.00034	0.09649	0.28048	0.00013	0.03201
15	0.04869	0.01804	0.00022	0.07139	0.08192	0.00027	0.01180
16	0.03284	0.00541	0.00042	0.07484	0.18578	0.00048	0.02198
17	0.05286	0.05015	0.00039	0.11981	0.18300	0.00162	0.02415
18	0.08742	0.00736	0.00029	0.10805	0.19654	0.00002	0.02524
19	0.05535	0.00609	0.00037	0.08680	0.32052	0.00027	0.03479
20	0.07251	0.00773	0.00023	0.08753	0.11413	0.00003	0.01634
21	0.04751	0.00492	0.00037	0.06033	0.06844	0.00003	0.01037
22	0.05406	0.06625	0.00023	0.08095	0.46971	0.00002	0.04854
23	0.07579	0.01063	0.00038	0.15049	0.31147	0.00010	0.03669
24	0.14682	0.02880	0.00038	0.19728	0.24894	0.00008	0.03545
25	0.06431	0.00960	0.00028	0.08485	0.09702	0.00003	0.01481
26	0.14684	0.01047	0.00049	0.20226	0.18470	0.00000	7.26417
27	0.12581	0.02360	0.00036	0.29949	2.29698	9.42630	0.96348
28	0.13059	0.04358	0.00032	0.09936	11.35415	0.00001	1.05444
29	0.37822	0.07654	0.00045	0.14885	0.90345	0.00001	0.43228
30	0.07260	0.04512	9.20555	0.10014	0.11716	0.00001	0.03268
31	0.12063	6.91224	0.00055	0.19642	0.24995	0.00001	0.05258
32	10.45957	0.31518	0.00034	0.09669	0.38851	0.00001	0.17323
33	0.20322	0.01203	0.00415	0.25853	0.24156	0.00002	0.07746
34	0.07129	0.00656	0.00036	0.15476	0.15466	0.00000	0.02226
35	0.10995	0.01803	0.00048	0.15305	0.27907	0.00023	0.04524
36	0.05620	0.02209	0.01585	0.07599	0.11076	0.00002	0.02868
37	0.42885	0.13258	0.00090	0.17374	1.05066	0.00002	0.21204
38	0.05743	0.01382	0.00249	0.26516	0.13344	0.00001	0.02609
39	0.30442	0.02323	0.00042	0.12859	0.08829	0.00000	0.02018
40	0.23256	0.02494	0.00244	0.06684	0.15911	0.00001	0.02733
41	0.07101	0.01464	0.00019	0.06443	0.11661	0.00001	0.02380
42	0.03129	0.00892	0.00054	0.07493	0.15121	0.00004	0.01966

	33 Non-metallic mineral products	34 Products of coal and petroleum	35 Chemicals and allied products	36 Miscellaneous manufacturing	37 Construction
1	0.02573	0.09878	0.26841	0.01811	0.44476
2	0.01118	0.06845	0.02088	0.00798	0.23628
3	0.04343	0.08343	0.06013	0.41482	0.08327
4	0.07050	0.03753	0.30173	0.01906	0.25967
5	0.01372	0.02968	0.09061	0.00977	0.27718
6	0.02124	0.05393	0.12641	0.01899	0.34916
7	0.04534	0.06772	0.37178	0.03367	0.39963
8	0.13783	0.07327	0.17529	0.02853	0.37053
9	0.09572	0.07051	0.04926	0.18876	0.25086
10	0.59218	0.04974	0.11048	0.03336	0.32354
11	0.04477	0.05658	0.39218	0.06159	0.47736
12	0.04387	0.06462	0.21077	0.04735	0.36760
13	0.03537	0.09243	0.24090	0.03742	0.62258
14	0.19265	0.03961	0.07009	0.02182	0.17364
15	0.01432	0.02680	0.08258	0.02543	0.16784
16	0.08878	0.03113	0.11311	0.03455	0.22455
17	0.02253	0.05848	0.19791	0.03382	0.34443
18	0.02481	0.03970	0.68230	0.03547	0.23619
19	0.03177	0.02514	0.10397	0.03497	0.22886
20	0.02454	0.01635	0.49214	0.02218	0.20745
21	0.01399	0.01183	0.19603	0.14475	0.16655
22	0.01704	0.02695	0.23962	0.03424	0.22029
23	0.01763	0.04635	0.11259	0.02833	0.20902
24	0.05770	0.05436	0.20264	0.02715	0.22581
25	0.02423	0.03093	0.26133	0.03365	0.24934
26	0.07148	0.20762	0.09666	0.02241	0.44662
27	0.03695	0.05123	0.15956	0.02338	0.25533
28	0.04713	0.05699	0.07745	0.02650	0.27809
29	0.10726	0.04101	0.15649	0.12554	0.20888
30	0.02640	0.02720	0.13514	0.11467	0.25744
31	0.04806	0.04236	0.13059	0.02925	0.45912
32	0.07788	0.02842	0.18352	0.05618	0.20800
33	0.70416	0.08663	0.16691	0.03173	0.29216
34	0.01629	1.38690	0.08943	0.02800	0.30624
35	0.15752	0.08482	7.74625	0.04147	0.22422
36	0.02490	0.04195	0.26696	11.11178	0.21714
37	0.60246	0.04991	0.40084	0.07975	19.43226
38	0.04880	0.03140	0.05693	0.11153	0.69709
39	0.03652	0.03481	0.04766	0.10700	0.66333
40	0.04834	0.05491	0.28286	0.03025	0.93854
41	0.05926	0.01754	0.05365	0.02947	1.84882
42	0.02284	0.02126	0.14711	0.23476	0.40534

	38 Transportation, storage, trade	39 Communication	40 Electric power, gas, water utilities	41 Finance, insurance, real estate	42 Service industries
1	C.74026	0.06244	0.06193	0.18361	0.12488
2	C.29055	0.02215	0.02214	C.03396	0.04148
3	0.37455	0.03680	0.02203	0.07489	0.05883
4	0.43360	0.07663	0.49585	0.07364	0.17404
5	0.22849	1.04644	0.25456	C.06224	C.10006
6	C.51880	1.10495	0.17669	C.09138	0.15334
7	1.47098	1.14956	0.08161	0.15194	0.20312
8	1.02092	1.15963	0.09648	0.14973	0.18914
9	1.08197	0.21326	0.07844	C.13133	0.26672
10	1.18653	0.14574	0.12143	C.15480	0.45443
11	2.76441	0.24698	0.12266	0.16803	C.48698
12	1.48941	0.30070	0.15955	C.18515	0.47952
13	0.79514	0.32953	C.10834	C.19018	0.83659
14	0.54593	0.16014	0.11281	C.13248	C.44016
15	0.48184	0.14284	0.06121	0.09558	0.23210
16	C.92719	0.20620	0.08087	0.13961	C.34770
17	0.91039	0.09600	0.09084	C.19166	0.75701
18	0.57540	0.32471	0.12235	0.22808	0.41257
19	C.85048	0.28431	0.08179	0.12674	0.25035
20	0.45571	C.13962	0.12017	0.09341	C.13885
21	0.41091	C.27269	0.07668	0.09557	0.15870
22	C.73270	0.30515	0.10193	0.12241	C.26362
23	C.91522	0.20472	0.08605	0.10352	0.18508
24	C.67823	C.24078	0.28347	0.11665	C.21309
25	0.55456	0.45696	0.13606	0.18460	0.32182
26	0.83503	C.10687	C.46017	C.09021	0.16763
27	0.81234	0.12195	0.14296	C.08747	C.17893
28	C.62558	0.21055	0.16343	C.13771	C.27933
29	0.57854	C.13694	0.10651	C.09022	C.19015
30	0.85559	0.36126	0.16847	C.15023	C.33659
31	1.20623	0.13996	C.26886	0.10525	0.26338
32	0.59122	0.23045	0.10774	C.10984	0.26915
33	C.79100	0.12514	0.29885	C.13225	0.21011
34	C.78161	0.12897	0.16676	0.17360	0.21286
35	C.86905	0.26229	0.21591	0.17274	0.48307
36	0.51254	C.35001	0.07824	0.17224	C.37002
37	1.47223	0.17350	C.12405	0.15281	C.39155
38	6.97972	0.17775	0.08783	C.16766	0.44733
39	0.69955	17.27350	0.07422	C.12182	C.49409
40	0.41949	0.06254	6.74702	0.04642	C.12415
41	C.27191	0.17902	0.10169	5.02052	0.51243
42	0.41572	0.27876	0.20677	C.11707	10.26349



TABLE A-3

Summary of Effects of Adjusted

Parity

42 Industry Analysis

	(1)	(2)	(3)	(4)
	% Wage Increase Implied by Parity	Initial % Price Increase in Industry Achieving Parity	% Equilibrium Price Increase in Single Industry Achieving Parity	% Equilibrium Price Increase if, all Industries Achieving Parity
	$\Delta W^{(100)}$	$Q \Delta W^{(100)}$		
1 Agriculture	34.500000	1.897500	2.004099	5.399893
2 Forestry	34.500000	15.749250	15.762240	17.485142
3 Fishing, hunting, trapping	34.500000	5.471700	5.509438	7.663869
4 Metal mining, smelting, refining	34.450000	11.117015	11.136222	14.174085
5 Coal mining, crude petroleum, nat. gas	49.880000	13.088512	13.233588	14.911720
6 Non-metal mining, quarrying, prospect.	25.870000	5.481355	5.492306	12.615154
7 Meat products	37.010000	4.204336	4.593093	9.882729
8 Dairy products	45.350000	5.782125	5.886352	10.642236
9 Fish processing	42.670000	7.027749	7.035331	13.182793
10 Fruit & vegetable preparations	52.540000	8.780560	8.979495	15.892310
11 Grain mill products	35.270000	2.793284	3.054142	10.139448
12 Bakery products	51.480000	14.208480	14.209274	20.564185
13 Carbonated beverages	26.230000	4.299097	5.037287	11.105248
14 Alcoholic beverages	54.250000	9.042475	9.233712	12.842989
15 Confectionery & sugar refining	52.150000	7.685490	7.981830	10.429942
16 Miscellaneous food preparations	47.680000	4.046064	4.109238	7.648060
17 Tobacco & tobacco products	0.420000	0.055986	0.081458	4.945880
18 Rubber products	32.670000	7.628445	7.710391	11.679310
19 Leather products	41.550000	12.639510	16.728501	20.354383
20 Textile products (except clothing)	24.850000	6.625010	8.739344	11.153617
21 Clothing (textile & fur)	46.600000	12.973440	13.185326	18.168482
22 Furniture	34.310000	10.192501	10.375592	14.434350
23 Wood products (except furniture)	21.980000	5.380704	5.582135	12.774953
24 Paper products	16.780000	3.522122	4.048948	10.698662
25 Printing, publishing, & allied indus.	29.470000	10.977575	11.880952	16.209764
26 Primary iron & steel	27.650000	6.553050	7.264169	11.890266
27 Agricultural implements	29.270000	9.424940	9.426295	16.129524
28 Iron & steel products, n.e.s.	36.610000	10.679137	11.354148	15.269596
29 Transportation equipment (repairs)	39.150000	9.382086	10.148854	14.482314
30 Jewellery & silverware (incl. watch	34.500000	8.186850	9.205546	14.669506
31 Non-ferrous metal products, n.e.s.	35.730000	6.481422	6.912239	14.374095
32 Electrical apparatus & supplies	34.230000	9.804648	10.459567	14.181762
33 Non-metallic mineral products	32.130000	8.141742	8.704156	13.317512
34 Products of petroleum & coal	21.010000	1.285812	1.386902	8.462046
35 Chemicals & allied products	34.540000	6.652404	7.746247	12.238328
36 Misc. manufacturing industries	26.280000	10.669948	11.111780	14.290810
37 Construction	70.570000	19.145641	19.422262	26.460495
38 Transportation, storage, trade	15.910000	6.527873	6.979715	9.910665
39 Communication	25.640000	15.318072	17.273497	20.713915
40 Electric power, gas & water utilities	35.250000	5.361525	6.747022	10.099944
41 Finance, insurance, real estate	30.870000	4.581108	5.020520	8.867785
42 Service industries	22.400000	9.891840	10.263494	13.655749



TABLE ~~A~~4

Price Increase in Each Industry Resulting from Nominal

Wage Parity in Any Industry 1959

$$E = [I - A]^{-1} Q \Delta W$$

Nominal  
 her ~~Apparent~~ Parity Wage  
 Achieved Here

Prices Rise  
 Here

1 Agriculture

2 Forestry

1 Agriculture	1.40577	0.02771
2 Forestry	0.01448	11.05641
3 Fishing, hunting, trapping	0.00096	0.02395
4 Metal mining, smelting, refining	0.00355	0.03945
5 Coal mining, crude petroleum, prospecting	0.00102	0.01034
6 Non-metal mining, quarrying, prospecting	0.00197	0.06780
7 Meat products	0.71231	0.03640
8 Dairy products	0.69340	0.05502
9 Fish processing	0.00216	0.04179
10 Fruit & vegetable preparation	0.22511	0.12239
11 Grain mill products	0.44171	0.11771
12 Bakery products	0.16704	0.16036
13 Carbonated beverages	0.02011	0.10875
14 Alcoholic beverages	0.03778	0.13462
15 Confectionery and sugar refining	0.07797	0.09779
16 Miscellaneous food preparation	0.14247	0.08962
17 Tobacco and tobacco products	0.47665	0.14976
18 Rubber products	0.00721	0.04028
19 Leather products	0.08043	0.08150
20 Textile products (except clothing)	0.00973	0.04766
21 Clothing (textile and fur)	0.00806	0.03723
22 Furniture	0.00546	0.19679
23 Wood products (except furniture)	0.02900	2.98416
24 Paper products	0.02459	2.26074
25 Printing, publishing and allied industries	0.00750	0.49024
26 Primary iron and steel	0.00139	0.02632
27 Agricultural implements	0.00249	0.05443
28 Iron and steel products n.e.s.	0.00153	0.03977
29 Transportation equipment	0.00211	0.03845
30 Jewellery and silverware (including watch repair)	0.00218	0.05358
31 Non-ferrous metal products n.e.s.	0.00201	0.03794
32 Electrical apparatus and supplies	0.00243	0.04914
33 Non-metallc mineral products	0.00509	0.07928
34 Products of petroleum and coal	0.00128	0.02072
35 Chemicals and allied products	0.06804	0.09746
36 Miscellaneous manufacturing products	0.00493	0.08473
37 Construction	0.00770	0.28030
38 Transportation, storage, trade	0.00221	0.04866
39 Communication	0.00127	0.03084
40 Electric power, gas, water utilities	0.00317	0.05517
41 Finance, Insurance, Real Estate	0.00194	0.03669
42 Service Industries (excluding public admin. and defense)	0.01031	0.06236

	10 Fruit and vegetable preparations	9 Fish processing	8 Dairy products	7 Meat products	6 Non-metal mining, quarrying, and prospecting	5 Coal mining, crude petroleum, natural gas	4 Metal mining, smelting refining	3 Fishing, hunting, trapping
1	0.00008	0.00275	0.00064	0.00959	0.01465	0.25656	0.00840	0.00073
2	0.00002	0.00004	0.00004	0.00034	0.00406	0.17523	0.01164	0.00001
3	0.00003	0.00004	0.00012	0.00071	0.00512	0.21416	0.00663	3.86459
4	0.00010	0.00017	0.00020	0.00307	0.03706	0.13242	7.87779	0.00006
5	0.00005	0.00006	0.00010	0.00100	0.00416	10.25183	0.00638	0.00002
6	0.00008	0.00008	0.00015	0.00143	6.02855	0.21749	0.05089	0.00003
7	0.00013	0.01131	0.00051	3.31730	0.01431	0.18488	0.01126	0.00299
8	0.00157	0.00140	4.47025	0.00745	0.01831	0.20322	0.00905	0.00038
9	0.00015	5.27114	0.00024	0.00091	0.01157	0.19665	0.01371	1.38689
10	7.04909	0.00100	0.01456	0.13821	0.04996	0.14606	0.02442	0.00029
11	0.00037	0.03005	0.00588	0.08025	0.02190	0.16667	0.01188	0.00793
12	0.03127	0.00594	0.04370	0.25243	0.01400	0.18229	0.00923	0.00159
13	0.00153	0.00031	0.00520	0.00658	0.01287	0.24454	0.01293	0.00013
14	0.00406	0.00024	0.00094	0.00379	0.01861	0.11466	0.00807	0.00009
15	0.00337	0.00032	0.04626	0.01674	0.01191	0.08453	0.00984	0.00010
16	0.01199	0.00091	0.00523	0.02633	0.01203	0.08871	0.00643	0.00026
17	0.00042	0.00108	0.00077	0.00534	0.01188	0.15839	0.02440	0.00033
18	0.00023	0.00041	0.00047	0.00777	0.01863	0.10977	0.01851	0.00015
19	0.00014	0.00484	0.00026	0.19203	0.00729	0.07242	0.00818	0.00141
20	0.00009	0.00028	0.00023	0.00609	0.01166	0.05689	0.01010	0.00008
21	0.00009	0.00013	0.00019	0.00256	0.00582	0.03975	0.00632	0.02057
22	0.00015	0.00019	0.00026	0.00380	0.00732	0.07696	0.03337	0.00007
23	0.00011	0.00013	0.00018	0.00148	0.00591	0.12655	0.01006	0.00005
24	0.00012	0.00018	0.00022	0.00255	0.06458	0.17467	0.02474	0.00006
25	0.00018	0.00018	0.00031	0.00299	0.01823	0.09486	0.00994	0.00007
26	0.00009	0.00007	0.00015	0.00117	0.15444	0.56094	0.30163	0.00003
27	0.00010	0.00012	0.00017	0.00247	0.03547	0.14210	0.06665	0.00004
28	0.00015	0.00008	0.00023	0.00116	0.04011	0.15829	0.13564	0.00004
29	0.00010	0.00011	0.00020	0.00196	0.02152	0.11474	0.06397	0.00007
30	0.00018	0.00011	0.00030	0.00179	0.01191	0.08394	1.59168	0.00005
31	0.00014	0.00010	0.00023	0.00163	0.02388	0.12957	2.60356	0.00004
32	0.00015	0.00013	0.00025	0.00214	0.01391	0.08090	0.24579	0.00005
33	0.00013	0.00012	0.00021	0.00194	0.56458	0.28044	0.01942	0.00004
34	0.00012	0.00007	0.00018	0.00117	0.01201	3.50275	0.00719	0.00003
35	0.00029	0.00388	0.00217	0.07240	0.09109	0.23365	0.07669	0.00105
36	0.00020	0.00021	0.00212	0.00415	0.00832	0.11644	0.08416	0.00008
37	0.00022	0.00026	0.00040	0.00436	0.13788	0.14871	0.07561	0.00009
38	0.00024	0.00009	0.00036	0.00129	0.01164	0.12267	0.01007	0.00006
39	0.00027	0.00009	0.00039	0.00122	0.00748	0.09549	0.01514	0.00005
40	0.00007	0.00016	0.00016	0.00282	0.01187	0.36305	0.05144	0.00005
41	0.00028	0.00010	0.00039	0.00129	0.01889	0.06726	0.00936	0.00005
42	0.00560	0.00142	0.00762	0.01695	0.00691	0.07076	0.00943	0.00094



	11 Grain mill products	12 Bakery products	13 Carbonated beverages	14 Alcoholic beverages	15 Confectionery and sugar refining	16 Miscellaneous food preparations	17 Tobacco and tobacco products
1	0.19030	0.000016	0.000004	0.00142	0.00241	0.00230	-0.00000
2	0.00197	0.000005	0.000001	0.00004	0.00005	0.00005	-0.00000
3	0.00015	0.000008	0.000002	0.00008	0.00005	0.00010	-0.00000
4	0.00055	0.000023	0.000005	0.00038	0.00018	0.00024	-0.00000
5	0.00017	0.000013	0.000003	0.00011	0.00007	0.00008	-0.00000
6	0.00031	0.000020	0.000005	0.00016	0.00010	0.00014	-0.00000
7	0.09652	0.000026	0.000006	0.00102	0.00346	0.00500	-0.00000
8	0.09395	0.000024	0.000006	0.00077	0.02756	0.00494	-0.00000
9	0.00034	0.000035	0.000008	0.00006	0.00012	0.00015	-0.00000
10	0.03591	0.000059	0.000013	0.02144	0.23049	0.02861	-0.00000
11	2.17609	0.000063	0.000014	0.01288	0.01353	0.02431	-0.00000
12	0.37074	11.077374	0.000014	0.00268	0.22325	0.08298	-0.00000
13	0.00554	0.000108	3.22062	0.00091	0.57615	0.20786	-0.00000
14	0.01034	0.000057	0.000013	7.26442	0.02647	0.26861	-0.00000
15	0.01471	0.000030	0.000007	0.00037	6.25781	0.06161	-0.00000
16	0.05404	0.000045	0.000010	0.00909	0.07715	3.07904	-0.00000
17	0.06466	0.000098	0.000022	0.00061	0.00111	0.00106	-0.00000
18	0.00113	0.000053	0.000012	0.00085	0.00041	0.00059	-0.00000
19	0.01094	0.000032	0.000007	0.00019	0.00287	0.00052	-0.00000
20	0.00144	0.000018	0.000004	0.00062	0.00032	0.00037	-0.00000
21	0.00115	0.000021	0.000005	0.00025	0.00017	0.00118	-0.00000
22	0.00082	0.000034	0.000008	0.00030	0.00021	0.00034	-0.00000
23	0.00398	0.000024	0.000005	0.00016	0.00018	0.00113	-0.00000
24	0.00340	0.000028	0.000006	0.00027	0.00022	0.00146	-0.00000
25	0.00110	0.000042	0.000009	0.00033	0.00023	0.00049	-0.00000
26	0.00023	0.000022	0.000005	0.00012	0.00010	0.00013	-0.00000
27	0.00039	0.000023	0.000005	0.00020	0.00013	0.00017	-0.00000
28	0.00026	0.000036	0.000008	0.00010	0.00013	0.00014	-0.00000
29	0.00034	0.000025	0.000006	0.00020	0.00013	0.00020	-0.00000
30	0.00037	0.000044	0.000010	0.00017	0.00017	0.00018	-0.00000
31	0.00033	0.000034	0.000008	0.00016	0.00014	0.00016	-0.00000
32	0.00040	0.000035	0.000008	0.00023	0.00017	0.00022	-0.00000
33	0.00079	0.000027	0.000006	0.00022	0.00024	0.000401	-0.00000
34	0.00022	0.000028	0.000006	0.00011	0.00011	0.00011	-0.00000
35	0.01027	0.000063	0.000014	0.00961	0.00303	0.00428	-0.00000
36	0.00076	0.000048	0.000011	0.00033	0.00026	0.00028	-0.00000
37	0.00116	0.000051	0.000011	0.00050	0.00030	0.00066	-0.00000
38	0.00038	0.000058	0.000013	0.00007	0.00018	0.00017	-0.00000
39	0.00026	0.000064	0.000015	0.00006	0.00019	0.00016	-0.00000
40	0.00049	0.000016	0.000004	0.00035	0.00015	0.00022	-0.00000
41	0.00036	0.000066	0.000015	0.00007	0.00020	0.00018	-0.00000
42	0.00313	0.01329	0.00301	0.00022	0.00369	0.00222	-0.00000

25 Printing, publishing  
and allied industries

24 Paper products

23 Wood products  
(except furniture)

22 Furniture

21 Clothing (textile  
and fur)

20 Textile products  
(except clothing)

19 Leather products

18 Rubber products

1	0.07360	0.00745	0.01353	0.00070	0.00533	0.01069	0.01580	0.02348
2	0.00864	0.00057	0.00717	0.00037	0.00200	0.00825	0.00289	0.00752
3	0.00938	0.00352	0.05111	0.00060	0.00280	0.02736	0.00506	0.01112
4	0.02423	0.00092	0.00342	0.00060	0.00484	0.04625	0.00757	0.02224
5	0.02587	0.00072	0.00153	0.00051	0.00257	0.00727	0.00445	0.03250
6	0.03140	0.00155	0.00261	0.00115	0.00464	0.04618	0.03185	0.03362
7	0.05095	0.00486	0.00837	0.00098	0.00882	0.01512	0.02156	0.04013
8	0.05189	0.00463	0.00820	0.00081	0.00685	0.01649	0.03687	0.04201
9	0.03900	0.00263	0.02073	0.00090	0.00760	0.03185	0.01770	0.04959
10	0.02282	0.00291	0.00518	0.00095	0.00896	0.02446	0.09090	0.07698
11	0.03803	0.00513	0.02614	0.00164	0.01579	0.01604	0.09119	0.09294
12	0.04028	0.00340	0.00857	0.00112	0.01051	0.01192	0.13063	0.08748
13	0.09389	0.00236	0.00633	0.00101	0.00895	0.03516	0.07302	0.10588
14	0.02408	0.00181	0.00295	0.00061	0.00578	0.01747	0.10573	0.05701
15	0.01283	0.00162	0.01318	0.00043	0.00424	0.00521	0.08092	0.05147
16	0.01783	0.00215	0.00357	0.00067	0.00685	0.00737	0.07254	0.06616
17	0.03788	0.00410	0.00666	0.00097	0.00884	0.02794	0.11220	0.08030
18	5.35975	0.05238	0.20417	0.01042	0.00678	0.00979	0.02885	0.05873
19	0.07567	12.45679	0.02708	0.05902	0.00633	0.05728	0.03751	0.04971
20	0.02180	0.02551	5.44407	0.00053	0.00401	0.01656	0.03142	0.02836
21	0.01706	0.01175	1.80288	10.07574	0.00380	0.01019	0.02609	0.04377
22	0.03969	0.07501	0.14564	0.00095	8.26479	0.25669	0.01929	0.04688
23	0.01195	0.00121	0.00599	0.00070	0.00635	4.54088	0.01072	0.03081
24	0.01392	0.01518	0.01765	0.00076	0.00637	0.01677	1.93519	0.04122
25	0.01217	0.00384	0.00477	0.00053	0.00605	0.00885	0.41649	7.96633
26	0.02380	0.00118	0.00208	0.00076	0.00677	0.01885	0.01149	0.02979
27	0.31526	0.04656	0.01974	0.00165	0.00627	0.05835	0.01364	0.03028
28	0.01462	0.00091	0.00154	0.00055	0.00613	0.03333	0.01512	0.03813
29	0.18075	0.01449	0.02072	0.01682	0.01822	0.03069	0.01393	0.02837
30	0.01086	0.00169	0.00201	0.00066	0.00717	0.02797	0.03004	0.04906
31	0.01632	0.00136	0.00243	0.00092	0.00844	0.03319	0.01340	0.06169
32	0.03767	0.00207	0.01438	0.00058	0.07969	0.03331	0.02322	0.04192
33	0.02854	0.00168	0.00966	0.00086	0.00727	0.02642	0.05295	0.04005
34	0.04218	0.00131	0.00253	0.00072	0.00629	0.00831	0.01277	0.04279
35	0.02070	0.00192	0.00610	0.00084	0.00823	0.03675	0.06270	0.07261
36	0.02751	0.07250	0.01595	0.00087	0.00572	0.03612	0.05230	0.05924
37	0.03195	0.00238	0.00481	0.00108	0.01708	0.28570	0.05821	0.05458
38	0.03393	0.00540	0.00538	0.00334	0.03337	0.02366	0.02769	0.09383
39	0.03494	0.00194	0.00850	0.00077	0.02892	0.01619	0.01663	0.15477
40	0.01154	0.00082	0.00157	0.00035	0.01231	0.05837	0.01352	0.03112
41	0.00559	0.00086	0.00146	0.00046	0.03457	0.02991	0.01259	0.11684
42	0.00836	0.00262	0.00314	0.00504	0.04467	0.02381	0.03973	0.51173



	26 Primary iron and steel	27 Agriculture implements	28 Iron and steel products	29 Transportation equipment	30 Jewellery and silverware (including watch repairs)	31 Non-ferrous metal products, n.e.s.	32 Electrical apparatus and supplies
1	0.01611	0.00296	0.15600	0.09288	0.00021	0.00423	0.02162
2	0.02392	0.00003	0.26897	0.10301	0.00018	0.01169	0.01320
3	0.01015	0.00000	0.06259	0.18633	0.00052	0.00275	0.01465
4	0.01901	0.00001	0.17543	0.14386	0.00025	0.00617	0.09214
5	0.01255	0.00000	0.10105	0.15266	0.00013	0.00333	0.01844
6	0.02119	0.00000	0.13668	0.37953	0.00019	0.00562	0.02981
7	0.02082	0.00150	0.21430	0.10034	0.00040	0.00532	0.03765
8	0.01904	0.00146	0.19008	0.10387	0.00033	0.00481	0.03408
9	0.03948	0.00000	0.45392	0.13277	0.00048	0.00569	0.04554
10	0.08088	0.00047	0.98202	0.10862	0.00051	0.00893	0.06416
11	0.01515	0.00093	0.12664	0.13026	0.00074	0.00696	0.04249
12	0.01149	0.00035	0.09037	0.11405	0.00044	0.00604	0.03962
13	0.02783	0.00004	0.31156	0.06798	0.00026	0.00716	0.03288
14	0.01709	0.00008	0.18089	0.07078	0.00024	0.00431	0.04402
15	0.00630	0.00016	0.05283	0.05237	0.00015	0.01222	0.03441
16	0.01173	0.00030	0.11981	0.05491	0.00029	0.00366	0.02320
17	0.01289	0.00100	0.11802	0.08789	0.00027	0.03396	0.03736
18	0.01347	0.00002	0.12675	0.07927	0.00020	0.00498	0.06178
19	0.01857	0.00017	0.20671	0.06368	0.00026	0.00412	0.03912
20	0.00872	0.00002	0.07360	0.06421	0.00016	0.00523	0.05124
21	0.00553	0.00002	0.04414	0.04426	0.00026	0.00333	0.03386
22	0.02591	0.00001	0.30292	0.05938	0.00023	0.04487	0.03820
23	0.01958	0.00006	0.20087	0.11040	0.00026	0.00720	0.05356
24	0.01892	0.00005	0.16055	0.14473	0.00027	0.01951	0.10375
25	0.00791	0.00002	0.06257	0.06224	0.00020	0.00650	0.04545
26	3.87773	0.00000	0.11911	0.14838	0.00034	0.00709	0.10377
27	0.51432	5.83226	1.48134	0.21971	0.00025	0.01598	0.08891
28	0.56288	0.00000	7.32236	0.07289	0.00022	0.02952	0.09228
29	0.23076	0.00000	0.58264	7.44526	0.00031	0.05184	0.26728
30	0.01744	0.00000	0.07555	0.07346	6.45722	0.03056	0.05130
31	0.02807	0.00000	0.16119	0.14409	0.00038	4.68167	0.08525
32	0.09247	0.00001	0.25055	0.07093	0.00024	0.21347	7.39147
33	0.04135	0.00001	0.15578	0.18966	0.000291	0.00815	0.14361
34	0.01188	0.00000	0.09974	0.11353	0.00025	0.00444	0.05038
35	0.02415	0.00014	0.17998	0.11228	0.00034	0.01221	0.07770
36	0.01531	0.00001	0.07143	0.05575	0.01112	0.01496	0.03971
37	0.11319	0.00002	0.67758	0.12746	0.00063	0.08980	0.30306
38	0.01393	0.00000	0.08606	0.19453	0.00175	0.00936	0.04059
39	0.01077	0.00000	0.05694	0.09434	0.00029	0.01573	0.21512
40	0.01459	0.00001	0.10261	0.04903	0.00171	0.01689	0.16434
41	0.01270	0.00000	0.07520	0.04726	0.00013	0.00992	0.05018
42	0.01050	0.00002	0.09752	0.05497	0.00038	0.00604	0.02211

	33 Non-metallic mineral products	34 Products of coal and petroleum	35 Chemicals and allied products	36 Miscellaneous manufacturing	37 Construction	38 Transportation, storage, trade
1	0.01780	0.05609	0.18992	0.01301	0.36416	0.33593
2	0.00773	0.03887	0.01478	0.00573	0.19346	0.13185
3	0.03004	0.04738	0.04255	0.29796	0.06818	0.16997
4	0.04876	0.02131	0.21350	0.01369	0.21260	0.19677
5	0.00949	0.01685	0.06412	0.00702	0.22694	0.10369
6	0.01469	0.03062	0.08945	0.01364	0.28588	0.23543
7	0.03135	0.03845	0.26307	0.02419	0.32720	0.66754
8	0.09532	0.04160	0.12403	0.02049	0.30338	0.46330
9	0.06620	0.04004	0.03486	0.13558	0.20539	0.49100
10	0.40953	0.02824	0.07817	0.02396	0.26490	0.53845
11	0.03096	0.03213	0.27821	0.04424	0.39085	1.25450
12	0.03034	0.03669	0.14914	0.03401	0.30098	0.67590
13	0.02446	0.05248	0.17045	0.02688	0.50974	0.36084
14	0.13323	0.02249	0.04960	0.02285	0.14217	0.24774
15	0.00990	0.01522	0.05843	0.01826	0.13742	0.21866
16	0.06140	0.01767	0.08004	0.02481	0.18385	0.42076
17	0.01558	0.03321	0.14004	0.02429	0.28200	0.41314
18	0.01716	0.02254	0.48279	0.02548	0.19338	0.26112
19	0.02197	0.01427	0.07357	0.02512	0.18738	0.38595
20	0.01725	0.00928	0.34823	0.01593	0.16985	0.20680
21	0.00968	0.00672	0.13871	0.10398	0.13636	0.18647
22	0.01179	0.01530	0.16956	0.02459	0.18036	0.33296
23	0.01219	0.02632	0.07967	0.02035	0.25301	0.41533
24	0.03990	0.03086	0.14339	0.01950	0.26676	0.30778
25	0.01676	0.01756	0.18491	0.02417	0.20415	0.25166
26	0.04943	0.11789	0.06840	0.01610	0.36567	0.37894
27	0.02555	0.02909	0.11290	0.01680	0.20906	0.36864
28	0.03259	0.03236	0.05480	0.01903	0.22769	0.28389
29	0.07418	0.02329	0.11073	0.09017	0.17102	0.26254
30	0.01826	0.01544	0.09562	0.08237	0.21078	0.38827
31	0.03323	0.02405	0.09240	0.02101	0.37591	0.54739
32	0.05386	0.01614	0.12985	0.04035	0.17030	0.26830
33	6.01949	0.04919	0.11811	0.02279	0.23921	0.35896
34	0.01127	0.78752	0.06328	0.02011	0.25074	0.35470
35	0.10893	0.04816	5.48113	0.02979	0.26546	0.39438
36	0.01722	0.02382	0.18890	7.98161	0.17778	0.23259
37	0.41664	0.02834	0.28363	0.05728	15.91039	0.66810
38	0.03375	0.01783	0.04028	0.08011	0.57075	3.16741
39	0.02525	0.01976	0.03373	0.07686	0.54311	0.31746
40	0.03343	0.03118	0.20014	0.02173	0.76844	0.19036
41	0.04099	0.00996	0.03796	0.02117	1.51374	0.12339
42	0.01580	0.01207	0.10409	0.16863	0.33188	0.18866

## 42 Service industries

41 Finance, insurance,  
real estate40 Electric power,  
gas, water utilities

## 39 Communication

1	0.04301	0.04409	0.12520	0.07370
2	0.01595	0.01577	0.02315	0.02448
3	0.02535	0.02281	0.05107	0.03472
4	0.05278	0.35307	0.05021	0.10271
5	0.03199	0.18126	0.04244	0.05905
6	0.07229	0.12581	0.06231	0.09050
7	0.10302	0.05811	0.10360	0.11988
8	0.10996	0.06870	0.10210	0.11163
9	0.21578	0.05585	0.08956	0.15741
10	0.10039	0.08647	0.10556	0.26819
11	0.17013	0.09518	0.11458	0.28741
12	0.20713	0.11361	0.12625	0.28300
13	0.22699	0.07715	0.12968	0.49374
14	0.11031	0.08033	0.09034	0.25977
15	0.09839	0.04359	0.06517	0.13698
16	0.14204	0.05758	0.09520	0.20520
17	0.06613	0.06468	0.13069	0.44677
18	0.22367	0.08712	0.15553	0.24349
19	0.19585	0.05824	0.08642	0.14775
20	0.09617	0.08557	0.06369	0.08195
21	0.18784	0.05460	0.06517	0.09366
22	0.21019	0.07258	0.08347	0.15558
23	0.14102	0.06127	0.07060	0.10923
24	0.16586	0.20185	0.07954	0.12576
25	0.31477	0.09688	0.12588	0.18993
26	0.07361	0.32766	0.06152	0.09893
27	0.08400	0.10180	0.05964	0.10560
28	0.14503	0.11637	0.09390	0.16485
29	0.09433	0.07584	0.06152	0.11223
30	0.24885	0.11996	0.10244	0.19865
31	0.09641	0.19144	0.07177	0.15544
32	0.15874	0.07672	0.07490	0.15885
33	0.08620	0.21280	0.09018	0.12400
34	0.08884	0.11874	0.11838	0.12562
35	0.18067	0.15374	0.11779	0.28510
36	0.24110	0.05571	0.11745	0.21838
37	0.11951	0.09545	0.10420	0.23109
38	0.12244	0.06254	0.11432	0.26401
39	11.89855	0.05285	0.08307	0.29160
40	0.04308	4.80426	0.03166	0.07327
41	0.12332	0.07241	3.42345	0.30242
42	0.19202	0.14723	0.07983	6.05729



TABLE B1

The 28 and 42 Industry Classifications Compared

Industry No. in 28 Indus. Classification	Industry No. in 42 Indus. Classification	Industry
1	1	Agriculture
2	2	Forestry
3	3	Fishing, hunting, trapping
4	4	Metal mining, smelting, refining
5	5	Coal mining, crude petroleum, natural gas
6	6	Non-metal mining, quarrying, prospecting
	7	Meat products
	8	Dairy products
	9	Fish processing
	10	Fruit and vegetable preparations
	11	Grain mill products
	12	Bakery products
7	13	Carbonated beverages
	14	Alcoholic beverages
	15	Confectionery and sugar refining
	16	Miscellaneous food preparation
8	17	Tobacco and tobacco products
9	18	Rubber products
10	19	Leather products
11	20	Textile products (except clothing)
12	21	Clothing (textile and fur)
13	22	Furniture
	23	Wood products (except furniture)
14	24	Paper products
15	25	Printing, publishing, and allied industries
16	26	Primary iron and steel
	27	Agriculture implements
	28	Iron and steel products, n.e.s.
17	29	Transportation equipment
22	30	Jewellery and silverware (including watch repair)
<del>16</del>	31	Non-ferrous metal products, n.e.s.
18	32	Electrical apparatus and supplies
19	33	Non-metallic mineral products
20	34	Products of petroleum and coal
21	35	Chemicals and allied products
22	36	Miscellaneous manufacturing industries
23	37	Construction
24	38	Transportation, storage, trade
25	39	Communication
26	40	Electric power, gas and water utilities
27	41	Finance, insurance, real estate
28	42	Service industries (excluding public administration and defense)

Note: For the relations of these industries to the D.B.S. Standard Industrial Classification (1948), see D.B.S. publication 13-513, op. cit., Table 10 and pages 26-34.



# APPENDIX B

Equilibrium Price Change in Each Industry Resulting  
From an Initial 1% Price Change in Any Industry  
-1959- (I-A)-1

Initial Price Change Here		1 Agriculture	2 Forestry	3 Fishing, hunting, trapping
Equilibrium Price Change Here				
1 Agriculture		1.00017	0.00020	0.00019
2 Forestry		0.01000	1.00002	0.00000
3 Fishing, hunting, trapping		0.00072	0.00210	1.00000
4 Metal mining, smelting, refining		0.00200	0.00357	0.00001
5 Coal mining, crude petroleum, prospecting		0.00070	0.00095	0.00000
6 Non-metal mining, quarrying, prospecting		0.00140	0.00015	0.00000
7 Meat products		0.55510	0.00529	0.00077
8 Dairy products		0.52090	0.00490	0.00009
9 Fish processing		0.00102	0.00570	0.50134
10 Fruit & vegetable preparation		0.10915	0.01107	0.00007
11 Grain mill products		0.55100	0.01065	0.00200
12 Bakery products		0.12549	0.01451	0.00041
13 Carbonated beverages		0.01510	0.00984	0.00005
14 Alcoholic beverages		0.02050	0.01210	0.00002
15 Confectionery and sugar refining		0.05057	0.00005	0.00002
16 Miscellaneous food preparation		0.10705	0.00011	0.00000
17 Tobacco and tobacco products		0.55011	0.01355	0.00000
18 Rubber products		0.00541	0.00504	0.00005
19 Leather products		0.00045	0.00757	0.00050
20 Textile products (except clothing)		0.00750	0.00451	0.00002
21 Clothing (textile and fur)		0.00005	0.00557	0.00555
22 Furniture		0.00410	0.01701	0.00001
23 Wood products (except furniture)		0.02178	0.27012	0.00001
24 Paper products		0.01047	0.20404	0.00001
25 Printing, publishing and allied industries		0.00505	0.04457	0.00001
26 Primary iron and steel		0.00104	0.00250	0.00000
27 Agricultural implements		0.00107	0.00492	0.00001
28 Iron and steel products n.e.s.		0.00114	0.00560	0.00000
29 Transportation equipment		0.00150	0.00548	0.00001
30 Jewellery and silverware (including watch repair)		0.00105	0.00485	0.00001
31 Non-ferrous metal products n.e.s.		0.00150	0.00545	0.00001
32 Electrical apparatus and supplies		0.00102	0.00444	0.00001
33 Non-metallic mineral products		0.00502	0.00717	0.00001
34 Products of petroleum and coal		0.00090	0.00107	0.00000
35 Chemicals and allied products		0.05111	0.00002	0.00027
36 Miscellaneous manufacturing products		0.00570	0.00700	0.00002
37 Construction		0.00570	0.02557	0.00002
38 Transportation, storage, trade		0.00100	0.00440	0.00001
39 Communication		0.00095	0.00279	0.00001
40 Electric power, gas, water utilities		0.00250	0.00499	0.00001
41 Finance, Insurance, Real Estate		0.00140	0.00552	0.00001
42 Service Industries (excluding public admin. and defense)		0.00774	0.00504	0.00024



18 Rubber products

17 Tobacco and tobacco products

16 Miscellaneous food preparations

15 Confectionery and sugar refining

14 Alcoholic beverages

13 Carbonated beverages

12 Bakery products

1	0.000001	0.000001	0.000010	0.000001	0.000075	0.000000	0.000000
2	0.000000	0.000000	0.000000	0.000000	0.000001	0.000000	0.000000
3	0.000000	0.000000	0.000001	0.000000	0.000003	0.000000	0.000000
4	0.000002	0.000001	0.000005	0.000002	0.000007	0.000000	0.000000
5	0.000001	0.000001	0.000001	0.000001	0.000002	0.000000	0.000000
6	0.000001	0.000001	0.000002	0.000001	0.000004	0.000000	0.000000
7	0.000002	0.000002	0.000010	0.000007	0.000004	0.000000	0.000000
8	0.000002	0.000002	0.000010	0.000007	0.000004	0.000000	0.000000
9	0.000003	0.000002	0.000000	0.000001	0.000005	0.000000	0.000000
10	0.000005	0.000004	0.000001	0.000005	0.000005	0.000000	0.000000
11	0.000005	0.000005	0.000001	0.000005	0.000001	0.000000	0.000000
12	1.000005	1.000005	0.000007	0.000005	0.000007	0.000000	0.000000
13	0.000000	1.17173	0.000012	0.000001	0.000001	0.000000	0.000000
14	0.000005	0.000004	1.02105	0.000005	0.000005	0.000000	0.000000
15	0.000002	0.000002	0.000005	1.000005	0.000002	0.000000	0.000000
16	0.000004	0.000003	0.0000127	0.000000	1.000001	0.000000	0.000000
17	0.000000	0.000000	0.000000	0.000000	0.000004	1.000000	0.000000
18	0.000004	0.000004	0.000011	0.000000	0.000000	0.000000	1.000000
19	0.000002	0.000002	0.000002	0.0000047	0.000017	0.000000	0.000000
20	0.000001	0.000001	0.000000	0.000005	0.000011	0.000000	0.000000
21	0.000001	0.000001	0.000005	0.000002	0.000005	0.000000	0.000000
22	0.000005	0.000002	0.000004	0.000005	0.000011	0.000000	0.000000
23	0.000002	0.000001	0.000002	0.000002	0.000007	0.000000	0.000000
24	0.000002	0.000002	0.000003	0.000005	0.000004	0.000000	0.000000
25	0.000005	0.000005	0.000004	0.000005	0.000016	0.000000	0.000000
26	0.000001	0.000001	0.000001	0.000001	0.000004	0.000000	0.000000
27	0.000002	0.000001	0.000002	0.000002	0.000005	0.000000	0.000000
28	0.000003	0.000002	0.000001	0.000002	0.000004	0.000000	0.000000
29	0.000002	0.000002	0.000002	0.000002	0.000006	0.000000	0.000000
30	0.000005	0.000003	0.000002	0.000002	0.000005	0.000000	0.000000
31	0.000003	0.000002	0.000002	0.000002	0.000005	0.000000	0.000000
32	0.000003	0.000002	0.000005	0.000002	0.000007	0.000000	0.000000
33	0.000002	0.000002	0.000005	0.000005	0.000012	0.000000	0.000000
34	0.000002	0.000002	0.000001	0.000001	0.000005	0.000000	0.000000
35	0.000005	0.000005	0.000015	0.000005	0.000014	0.000000	0.000000
36	0.000004	0.000003	0.000004	0.000004	0.000005	0.000000	0.000000
37	0.000004	0.000004	0.000007	0.000005	0.000021	0.000000	0.000000
38	0.000005	0.000004	0.000001	0.000005	0.000005	0.000000	0.000000
39	0.000005	0.000005	0.000000	0.000005	0.000005	0.000000	0.000000
40	0.000001	0.000001	0.000004	0.000002	0.000007	0.000000	0.000000
41	0.000005	0.000005	0.000000	0.000005	0.000005	0.000000	0.000000
42	0.000010	0.000010	0.000003	0.000001	0.000005	0.000000	0.000000



26 Primary iron and steel	25 Printing, publishing and allied industries	24 Paper products	23 Wood products (except furniture)	22 Furniture	21 Clothing (textile and fur)	20 Textile products (except clothing)	19 Leather products
1	0.00460	0.00319	0.00938	0.00244	0.00065	0.00327	0.00073
2	0.00683	0.00102	0.00171	0.00188	0.00024	0.00173	0.00002
3	0.00290	0.00151	0.00300	0.00625	0.00034	0.01238	0.00037
4	0.00543	0.00302	0.00449	0.01056	0.00059	0.00032	0.00002
5	0.00358	0.00441	0.00264	0.00166	0.00031	0.00037	0.00007
6	0.00605	0.00456	0.01892	0.01055	0.00057	0.00063	0.00016
7	0.00595	0.00545	0.01281	0.00345	0.00108	0.00202	0.00001
8	0.00544	0.00570	0.02190	0.00376	0.00084	0.00198	0.00002
9	0.01128	0.00673	0.01051	0.00727	0.00093	0.00502	0.00027
10	0.02312	0.01045	0.05399	0.00558	0.00110	0.00125	0.00030
11	0.00433	0.01262	0.05417	0.00366	0.00194	0.00633	0.00004
12	0.00328	0.01188	0.07760	0.00272	0.00129	0.00207	0.00006
13	0.00795	0.01438	0.04337	0.00803	0.00110	0.00153	0.00002
14	0.00488	0.00774	0.06280	0.00399	0.00071	0.00071	0.00010
15	0.00180	0.00699	0.04806	0.00119	0.00052	0.00319	0.00017
16	0.00335	0.00898	0.04309	0.00168	0.00084	0.00086	0.00021
17	0.00368	0.01090	0.06664	0.00638	0.00108	0.00161	0.00005
18	0.00385	0.00797	0.01713	0.00223	0.00083	0.04947	0.00005
19	0.00530	0.00675	0.02228	0.01308	0.00077	0.00656	1.32351
20	0.00249	0.00385	0.01866	0.00378	0.00049	1.31914	0.00005
21	0.00158	0.00594	0.01549	0.00232	0.00046	0.45685	0.00004
22	0.00740	0.00636	0.01145	0.05864	1.01786	0.03528	0.00009
23	0.00559	0.00418	0.00636	1.03745	0.00078	0.00145	0.00012
24	0.00540	0.00559	1.14957	0.00383	0.00078	0.00427	0.00161
25	0.00226	1.08229	0.24741	0.00202	0.00074	0.00115	0.00040
26	1.10851	0.00404	0.00682	0.00430	0.00083	0.00050	0.00012
27	0.14702	0.00411	0.00810	0.01332	0.00077	0.00476	0.00004
28	0.16090	0.00517	0.00898	0.00761	0.00075	0.00037	0.00001
29	0.06596	0.00385	0.00827	0.00701	0.00224	0.00501	0.00005
30	0.00498	0.00566	0.01784	0.00639	0.00088	0.00048	0.00007
31	0.00802	0.00838	0.00796	0.00758	0.00103	0.00058	0.00009
32	0.02643	0.00569	0.01379	0.00761	0.00981	0.00348	0.00005
33	0.01182	0.00544	0.03145	0.00603	0.00089	0.00234	0.00008
34	0.00330	0.00581	0.00758	0.00189	0.00077	0.00061	0.00007
35	0.00690	0.00386	0.03724	0.00839	0.00101	0.00147	0.00008
36	0.00437	0.00804	0.03106	0.00825	0.00070	0.00386	0.00008
37	0.03235	0.00741	0.03458	0.06527	0.00210	0.00116	0.00010
38	0.00398	0.01274	0.01644	0.00540	0.00411	0.00130	0.00003
39	0.00307	0.02102	0.00987	0.00369	0.00356	0.00206	0.00007
40	0.00417	0.00422	0.00803	0.01333	0.00151	0.00037	0.00005
41	0.00363	0.01587	0.00747	0.00683	0.00425	0.00035	0.00004
42	0.00300	0.06952	0.02360	0.00544	0.00550	0.00075	0.00005



33 Non-metallic mineral products

32 Electrical apparatus and supplies

31 Non-ferrous metal products, n.e.s.

30 Jewellery and silver-ware (including watch repairs)

29 Transportation equipment

28 Iron and steel products

27 Agriculture implements

1	0.00050	0.02265	0.01343	0.00005	0.00036	0.00312	0.00316
2	0.00000	0.03305	0.01496	0.00001	0.00266	0.00190	0.00137
3	0.00000	0.00000	0.02707	0.00008	0.00062	0.00211	0.00533
4	0.00000	0.02547	0.02030	0.00004	0.00140	0.01329	0.00865
5	0.00000	0.01467	0.02217	0.00002	0.00075	0.00266	0.00168
6	0.00000	0.01984	0.03314	0.00003	0.00126	0.00430	0.00260
7	0.00025	0.03111	0.01457	0.00007	0.00121	0.00545	0.00556
8	0.00025	0.02753	0.01309	0.00005	0.00109	0.00491	0.01632
9	0.00000	0.06530	0.01329	0.00008	0.00129	0.00657	0.01175
10	0.00008	0.14258	0.01576	0.00008	0.00203	0.00925	0.07273
11	0.00015	0.01338	0.01392	0.00012	0.00158	0.00613	0.00549
12	0.00006	0.01312	0.01657	0.00007	0.00137	0.00571	0.00538
13	0.00000	0.04523	0.00937	0.00004	0.00165	0.00474	0.00434
14	0.00001	0.02626	0.01026	0.00004	0.00093	0.00635	0.02566
15	0.00002	0.00767	0.00760	0.00002	0.00278	0.00496	0.00175
16	0.00003	0.01739	0.00737	0.00003	0.00035	0.00334	0.01039
17	0.00017	0.01713	0.01277	0.00004	0.00773	0.00539	0.00276
18	0.00000	0.01340	0.01151	0.00003	0.00113	0.00391	0.00364
19	0.00002	0.03001	0.00325	0.00004	0.00003	0.00564	0.00390
20	0.00000	0.01068	0.00332	0.00002	0.00119	0.00733	0.00306
21	0.00000	0.00640	0.00642	0.00004	0.00075	0.00488	0.00171
22	0.00000	0.04598	0.00662	0.00004	0.01022	0.00551	0.00203
23	0.00001	0.02316	0.01603	0.00004	0.00163	0.00773	0.00216
24	0.00000	0.02531	0.02102	0.00004	0.00444	0.01497	0.00708
25	0.00000	0.00036	0.00904	0.00003	0.00148	0.00635	0.00297
26	0.00000	0.01723	0.02135	0.00003	0.00161	0.01437	0.00377
27	1.00014	0.21303	0.03132	0.00004	0.00364	0.01283	0.00453
28	0.00000	1.06320	0.01039	0.00003	0.00672	0.01331	0.00578
29	0.00000	0.03453	1.06172	0.00003	0.01180	0.03857	0.01317
30	0.00000	0.01037	0.01067	1.12443	0.00696	0.00740	0.00324
31	0.00000	0.02340	0.02033	0.00006	1.06646	0.01230	0.00590
32	0.00000	0.03637	0.01030	0.00004	0.04662	1.06679	0.00350
33	0.00000	0.02261	0.02733	0.00003	0.00135	0.02072	1.06307
34	0.00000	0.01448	0.01649	0.00004	0.00101	0.00727	0.00200
35	0.00002	0.02613	0.01631	0.00003	0.00278	0.01121	0.01954
36	0.00000	0.01037	0.00803	0.00133	0.00340	0.00573	0.00305
37	0.00000	0.00838	0.01631	0.00010	0.02043	0.04373	0.07339
38	0.00000	0.01243	0.02626	0.00003	0.00213	0.00585	0.00399
39	0.00000	0.00826	0.01370	0.00003	0.00336	0.03104	0.00448
40	0.00000	0.01489	0.00712	0.00023	0.00384	0.02371	0.00593
41	0.00000	0.01091	0.00636	0.00002	0.00225	0.00724	0.00727
42	0.00000	0.01415	0.00793	0.00006	0.00137	0.00319	0.00280

## 39 Communication

38 Transportation,  
storage, trade

## 37 Construction

36 Miscellaneous manuf-  
acturing35 Chemicals and  
allied products34 Products of coal  
and petroleum

1	0.07682	0.04034	0.00169	0.02323	0.11339	0.00407
2	0.05323	0.00313	0.00074	0.01234	0.04450	0.00151
3	0.06488	0.00003	0.03887	0.00434	0.05737	0.00240
4	0.02918	0.04535	0.00178	0.01356	0.06642	0.00500
5	0.02307	0.01362	0.00091	0.01447	0.03500	0.00303
6	0.04194	0.01900	0.00177	0.01823	0.07947	0.00685
7	0.05266	0.05588	0.00315	0.02087	0.22533	0.00976
8	0.05698	0.02634	0.00267	0.01935	0.15639	0.01042
9	0.05483	0.00740	0.01769	0.01310	0.16574	0.02045
10	0.03868	0.01660	0.00312	0.01689	0.18176	0.00951
11	0.04400	0.05910	0.00377	0.02493	0.42347	0.01612
12	0.05025	0.03168	0.00443	0.01920	0.22816	0.01963
13	0.07188	0.03621	0.00350	0.03251	0.12180	0.02151
14	0.03080	0.01053	0.00298	0.00906	0.08362	0.01045
15	0.02084	0.01241	0.00238	0.00876	0.07381	0.00932
16	0.02420	0.01700	0.00323	0.01172	0.14203	0.01346
17	0.04548	0.02975	0.00316	0.01798	0.13946	0.00626
18	0.03087	0.10256	0.00332	0.01233	0.08814	0.02119
19	0.01955	0.01562	0.00327	0.01195	0.13028	0.01856
20	0.01271	0.07397	0.00207	0.01083	0.06981	0.00911
21	0.00320	0.02946	0.01356	0.00869	0.06294	0.01780
22	0.02095	0.03602	0.00320	0.01150	0.11239	0.01992
23	0.03604	0.01692	0.00265	0.01614	0.14020	0.01336
24	0.04227	0.03046	0.00254	0.01701	0.10339	0.01571
25	0.02405	0.03928	0.00315	0.01302	0.08495	0.02983
26	0.16146	0.01453	0.00210	0.02332	0.12791	0.00697
27	0.03984	0.02398	0.00219	0.01333	0.12444	0.00796
28	0.04432	0.01164	0.00248	0.01452	0.09583	0.01374
29	0.03189	0.02352	0.01176	0.01091	0.08862	0.00893
30	0.02115	0.02031	0.01074	0.01344	0.13106	0.02358
31	0.03294	0.01963	0.00274	0.02398	0.18478	0.00913
32	0.02210	0.02758	0.00526	0.01086	0.03056	0.01504
33	0.06737	0.02509	0.00297	0.01523	0.12117	0.00816
34	1.07861	0.01344	0.00262	0.01599	0.11973	0.00841
35	0.06596	1.16443	0.00388	0.01693	0.13312	0.01712
36	0.03262	0.04012	1.04140	0.01134	0.07851	0.02284
37	0.03861	0.06025	0.00747	1.01496	0.22552	0.01132
38	0.02441	0.00855	0.01045	0.03640	1.06921	0.01160
39	0.02706	0.00716	0.01002	0.03464	0.10716	1.12765
40	0.04270	0.04251	0.00283	0.04902	0.06426	0.00408
41	0.01363	0.00806	0.00276	0.09656	0.04165	0.01168
42	0.01653	0.02211	0.02200	0.02117	0.06363	0.01819



## 42 Service industries

41 Finance, insurance,  
real estate40 Electric power,  
gas, water utilities

1	0.01154	0.04008	0.01262
2	0.00412	0.00741	0.00410
3	0.00597	0.01634	0.00504
4	0.09248	0.01607	0.01750
5	0.04747	0.01358	0.01011
6	0.03295	0.01994	0.01550
7	0.01522	0.03316	0.02053
8	0.01799	0.03268	0.01912
9	0.01463	0.02866	0.02696
10	0.02264	0.03379	0.04503
11	0.02493	0.03667	0.04023
12	0.02075	0.04041	0.04847
13	0.02020	0.04151	0.08457
14	0.02104	0.02891	0.04449
15	0.01141	0.02086	0.02346
16	0.01508	0.03047	0.03514
17	0.01694	0.04183	0.07652
18	0.02282	0.04978	0.04170
19	0.01525	0.02766	0.02530
20	0.02241	0.02038	0.01403
21	0.01430	0.02086	0.01604
22	0.01901	0.02672	0.02665
23	0.01694	0.02260	0.01871
24	0.05287	0.02346	0.02154
25	0.02537	0.04029	0.03253
26	0.08582	0.01969	0.01694
27	0.02566	0.01709	0.01896
28	0.03048	0.03006	0.02323
29	0.01936	0.01969	0.01922
30	0.03142	0.03279	0.03402
31	0.05014	0.02297	0.02662
32	0.02009	0.02397	0.02720
33	0.05573	0.02886	0.02124
34	0.03110	0.03789	0.02151
35	0.04027	0.03770	0.04683
36	0.01459	0.03759	0.03740
37	0.02500	0.03335	0.03958
38	0.01638	0.03659	0.04522
39	0.01384	0.02659	0.04994
40	1.25841	0.01013	0.01255
41	0.01896	1.09591	0.05180
42	0.03856	0.02555	1.03756





